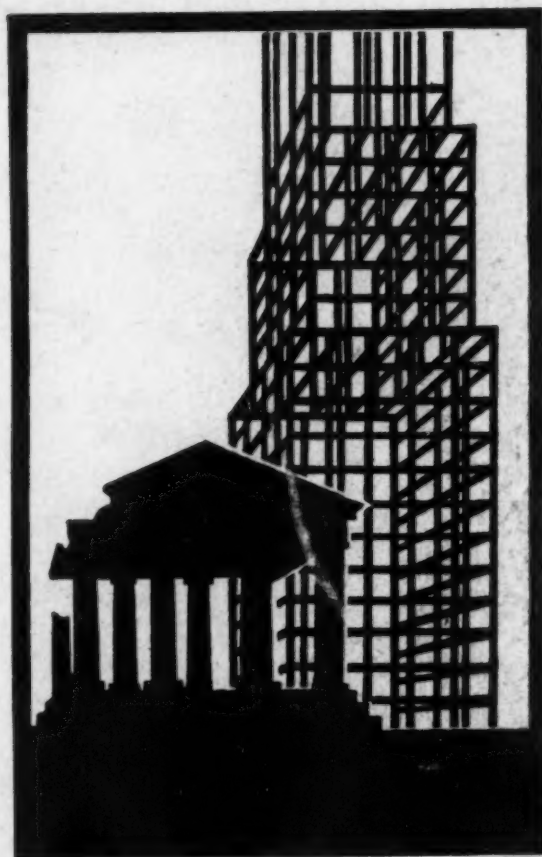


FEB 20 1931

THE ARCHITECTURAL RECORD



FEBRUARY
1931

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... Residence of Frank M. Tait, Dayton, Ohio. Louis Lott, architect; John C. Gohn, contractor, both of Dayton.

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THE ARCHITECTURAL RECORD

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FEBRUARY, 1931

NUMBER 2

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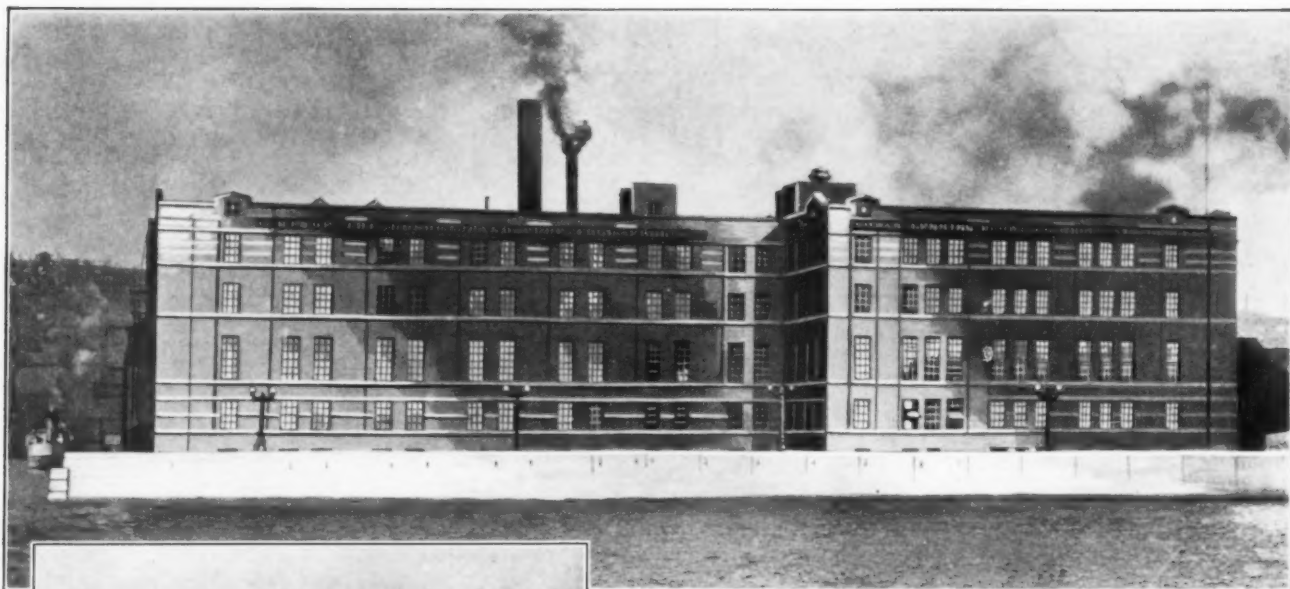
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The Gowan-Lenning-Brown Wholesale Warehouse, Duluth, Minnesota. F. G. German, Architect. Lief Jenson, Asst. Architect. W. J. Zitterell, Contractor.

When this building was erected 15 years ago its basement was laid in a marsh. But all concrete was waterproofed with Truscon Integral Waterproofing Paste. As a result the basement, where groceries and food products are stored below lake level, has always been absolutely watertight and is so today. Could anything demonstrate more forcibly the efficacy of Truscon Waterproofing Paste?

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ARCHITECTS' ANNOUNCEMENTS

CALENDAR OF EVENTS

February	Exhibition of etchings by William H. Wallace and lithographs by Vernon Howe Bailey in the Print Room (Room 316) of the New York Public Library.
Feb. 1-28	Annual exhibition of the Architectural League of Greater Miami, Florida.
Feb. 1-28	Exhibition of Persian Art, London (Burlington House).
Feb. 1-March 12	Art Exhibition, Royal Society of Painters, Etchers and Engravers, London (5a, Pall Mall East).
Feb. 21	Closing date for applications for scholarships for special students, School of Architecture, Harvard University. Apply to Dean G. H. Edgell, Robinson Hall, Cambridge, Mass.
March 14	Programs for the A. W. Brown Traveling Scholarship will be issued, calling for delivery of drawings on April 13. Apply to William Dewey Foster, 25 West 45th Street, New York City.
March 16-18	Seventh annual meeting of the Concrete Reinforcing Steel Institute at Biloxi, Miss.
March 28-May 29	Exhibition, Royal Society of Painters in Water Colours, London (5a, Pall Mall East).
March 30-April 4	House and Garden Exposition, Grand Central Palace, New York City.
April	Second International Congress and Exhibition of Sanitary Engineering and Municipal Hygiene, Milan, Italy. For information, apply to the Secretary General, Congress Internazionale di Tecnica Sanitaria e di Igiene Urbanistica, Milano, Piazza del Duomo 17.
April 3	Architectural students wishing to enter a competition for "the design of the most beautiful highway bridge in steel" are invited to submit to the American Institute of Steel Construction, 200 Madison Avenue, New York City, their preliminary sketches to be placed in judgment on this date.
April 7-May 2	Exhibition of Ideal Homes, London (Olympia).
April 14-16	Convention of American Institute of Architects, San Antonio, Texas.
April 18	Closing date for applications for Princeton Prizes in Architecture. Address the Director, School of Architecture, Princeton University, Princeton, N. J.
April 18-25	Fourth Biennial Architectural and Allied Arts Exposition, Grand Central Palace, New York City.
May	Exhibition of British Contemporary Art, London (Imperial Institute).
May 4-Aug. 8	Art Exhibition, Royal Academy, London (Burlington House).
May-August	Art Exhibition, Royal Scottish Academy, Edinburgh.
June 1-5	International Town Planning and Housing Federation Congress, Berlin.
July 10-Aug. 30	Vacation-study tour of housing, arranged and directed by The Garden Cities and Town Planning Association, London, in co-operation with the City Affairs Committee, 112 East 19th Street, New York City. For information, address Helen Alfred, Housing Chairman.
October 1	Closing date for entries for Lincoln Arc Welding Prize competition. Address inquiries to the Lincoln Electric Company, Cleveland, Ohio.
October-December	Art Exhibition, Royal Society of Painters in Water Colours, London (5a, Pall Mall East).

ANNOUNCEMENTS

Nimmons, Carr and Wright, architects, 333 North Michigan Avenue, Chicago, announce that Daniel Edwards Sawyer will be associated with them in the administration of their work.

Hermann Schoenfeldt, designer and craftsman, has opened a studio for interior architecture and industrial design at 180 North Michigan Avenue, Chicago, and would appreciate receiving manufacturers' catalogs.

Louis H. Gerding announces the opening of a new office at 708 La Salle Street, Ottawa, Illinois.

John Henri Deeken and Hubert Marion Garriott announce their association in the practice of architecture.

LECTURES BY HENRY S. CHURCHILL

Continuing through February on Thursday evenings will be the series of lectures by Henry S. Churchill, architect, at the New School of Social Research, New York City. The lectures will concern tendencies of modern architecture in America, stressing the new requirements and economic factors, materials and methods.

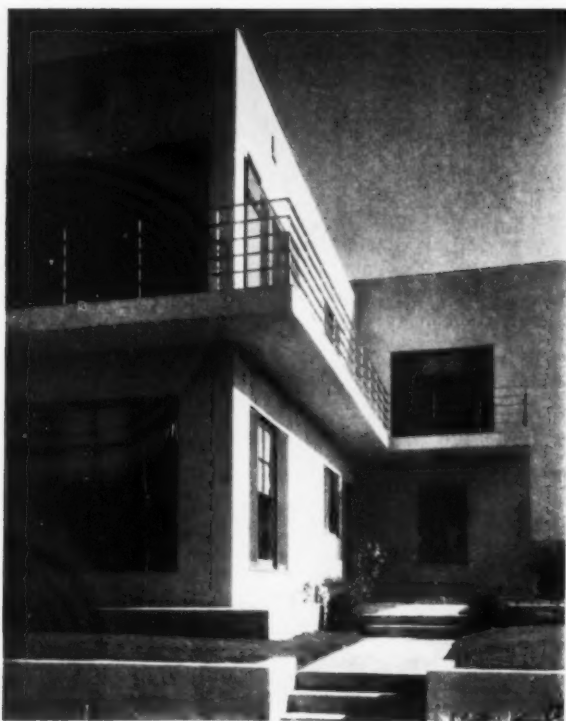
SMALL HOUSE EXHIBIT

The House Beautiful magazine announces the following itinerary for its traveling exhibit of photographs and plans of recently built or remodeled houses selected from its annual Small-House Competition: February 9-21, Indianapolis, John Herron Art Institute; February 26-March 9, Pittsburgh, Pittsburgh Architectural Club; March 12-26, Cleveland, Builders' Exchange Building; March 30-April 11, Chicago, Builders' Exchange, 228 North La Salle Street; April 18-25, New York City, Architectural and Allied Arts Exposition, Grand Central Palace; May 4-16, Detroit, Architects Exhibit Corporation, Barlum Tower.

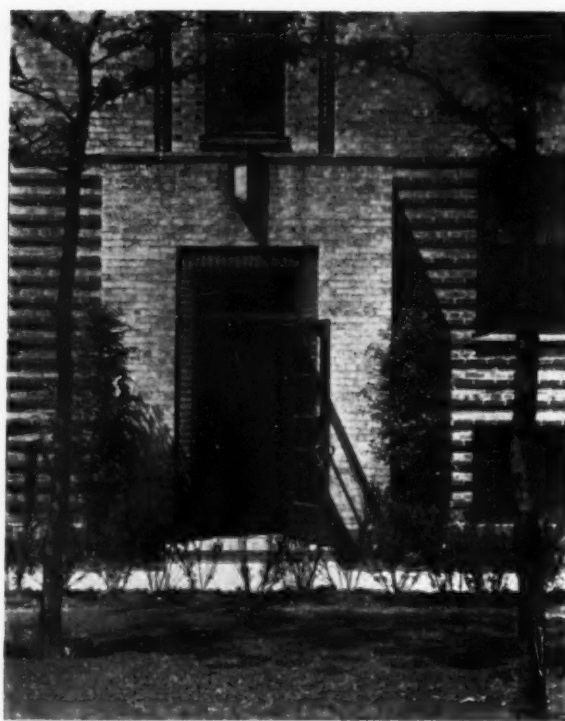
THE PRINCETON PRIZES IN ARCHITECTURE

Two competitive prizes of \$800 each, in the School of Architecture, Princeton University, are announced for the year of 1931-1932. The prizes will be awarded as the result of a competition in design to be held from 9:00 a. m. May 22, to 9:00 a. m. June 1. The winners will devote the following school year to the study of advanced architectural design, and such other subjects as they may elect. They are exempt from tuition fees.

Applications to enter the competition for the prizes must be filed on or before April 18, 1931. For application blanks and regulations governing the competition and award, address The Director, The School of Architecture, Princeton University, Princeton, N. J.



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THE MARCH ISSUE: APARTMENT HOUSES

The Apartment House to be successful must be rentable. It must have efficiency in planning, attractiveness in appearance, recreation facilities and labor saving conveniences that are compensations for living in the multi-family dwelling. A study has been made of these practical elements with a view to aiding the architect to plan effectively the new type apartment.

Henry Wright, lecturer at Cornell University and the University of Illinois on apartment planning, and associated architect with Clarence Stein on the Sunnyside and Phipps Apartment developments, will discuss the changing trends in apartment design. He will also indicate ways in which architects may associate themselves with apartment and other housing undertakings.

An extremely useful feature of the issue will be the collection of successful plans for the 1, 2, 3, 5 and 8 room apartment with critical discussion by Henry Wright, Arthur Holden and R. L. Davison. The comment will evaluate arrangement advantages, room sizes, desirability of duplex living rooms, kitchenettes, dining rooms and dinettes, and features that make for rentability and economy.

Recreation facilities for the apartment will be considered in detail, including playgrounds for children, space requirements for tennis courts, games, sand plots, recreation for adults, porches and roof terraces. With the information given the architect will be able to determine the amount of recreation space that is needed for apartments of various sizes.

Closets and storage space necessary to apartments will be analyzed from the angle of accommodation needs. What constitutes a compact closet? What is the value of cedar in the clothes closet? How should furs be stored? What are efficient doors for closets, medicine cabinets and kitchen cupboards? Every angle of closet planning and arrangement will be subjected to thoughtful consideration with illustrations and drawings of desirable solutions.

We believe that this issue of *The Record* will prove a distinct assistance to the architect in planning the small or large building for living accommodations. The illustrations will cover the entire country with emphasis on elements that have practical value to the architect.

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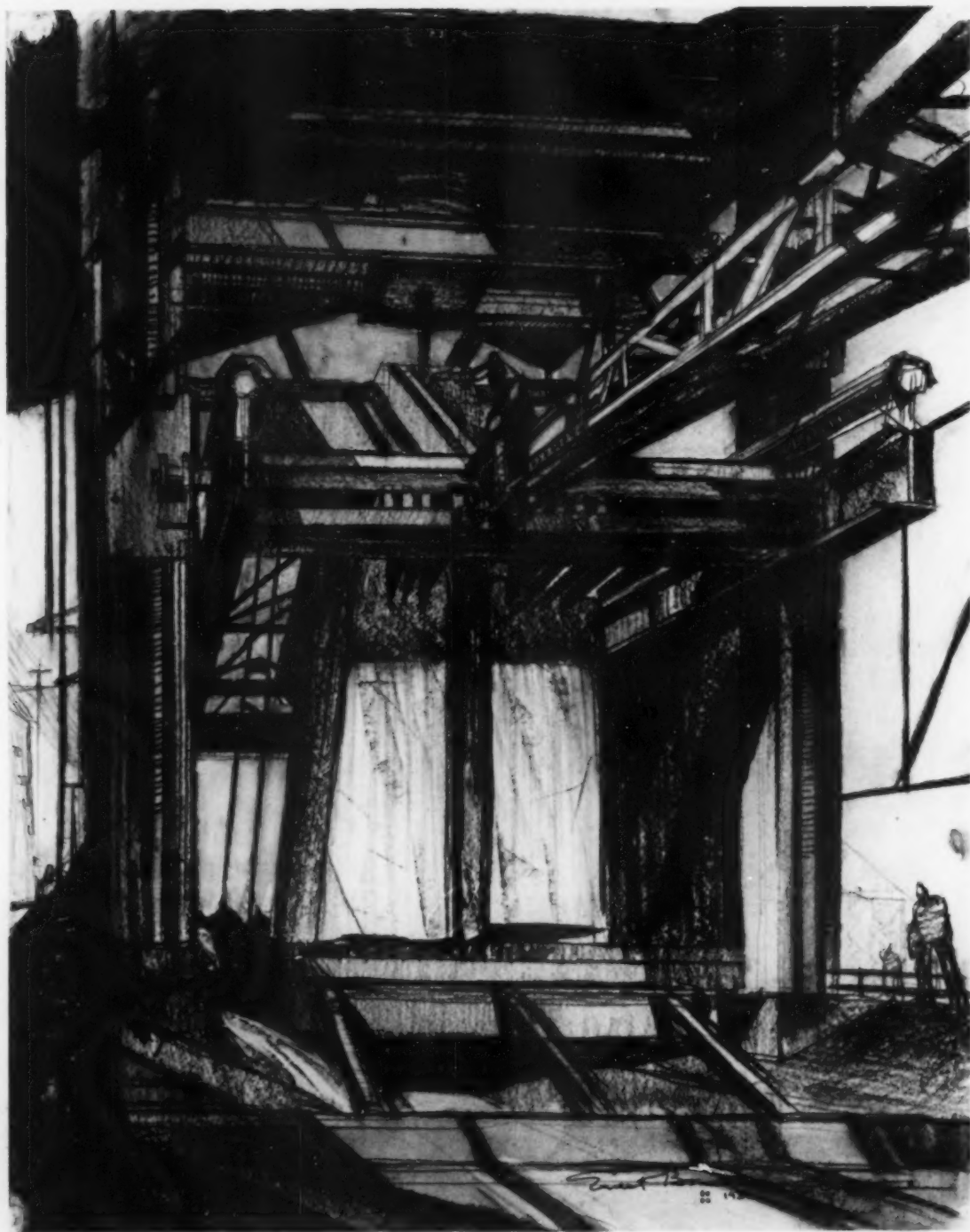
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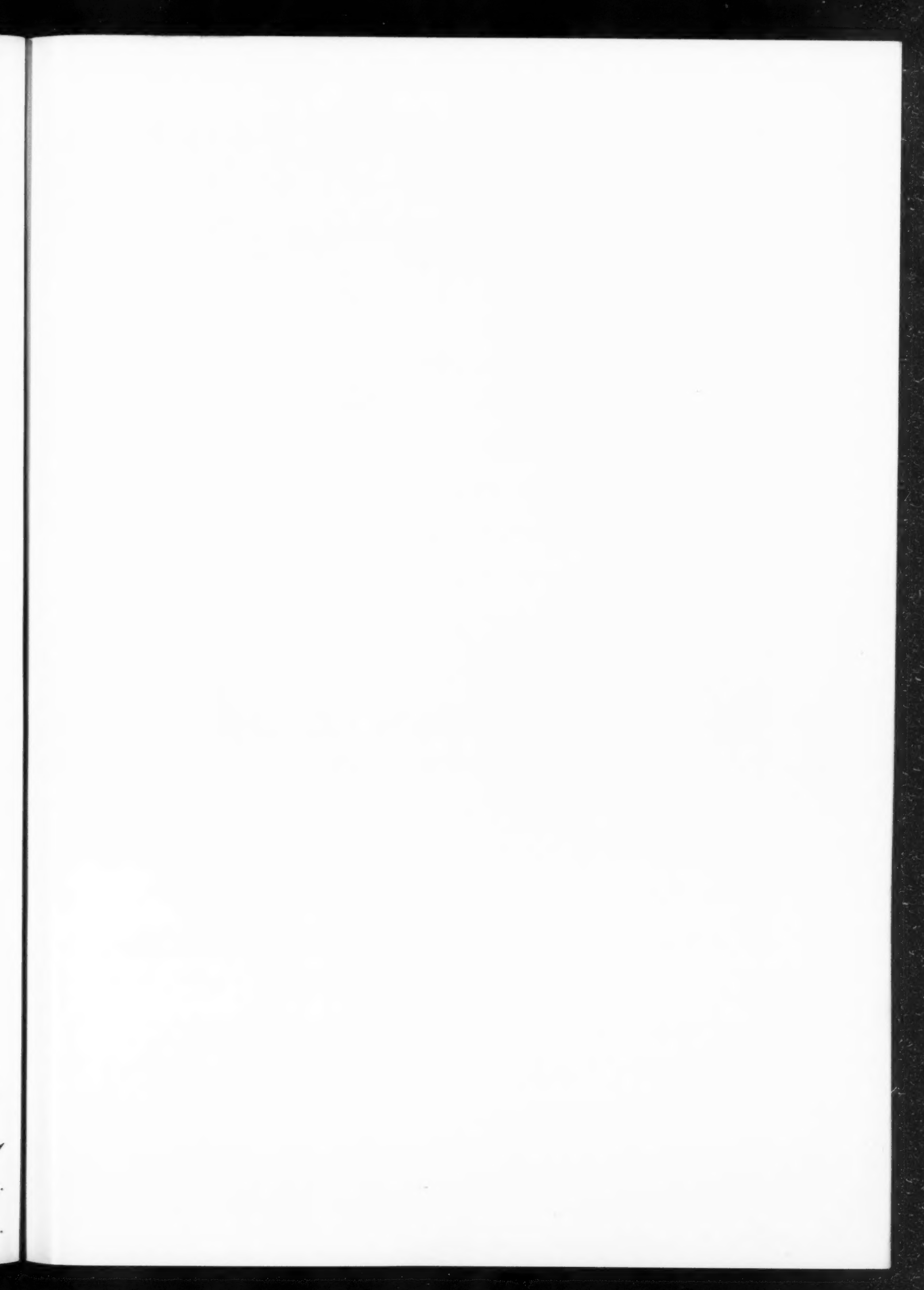
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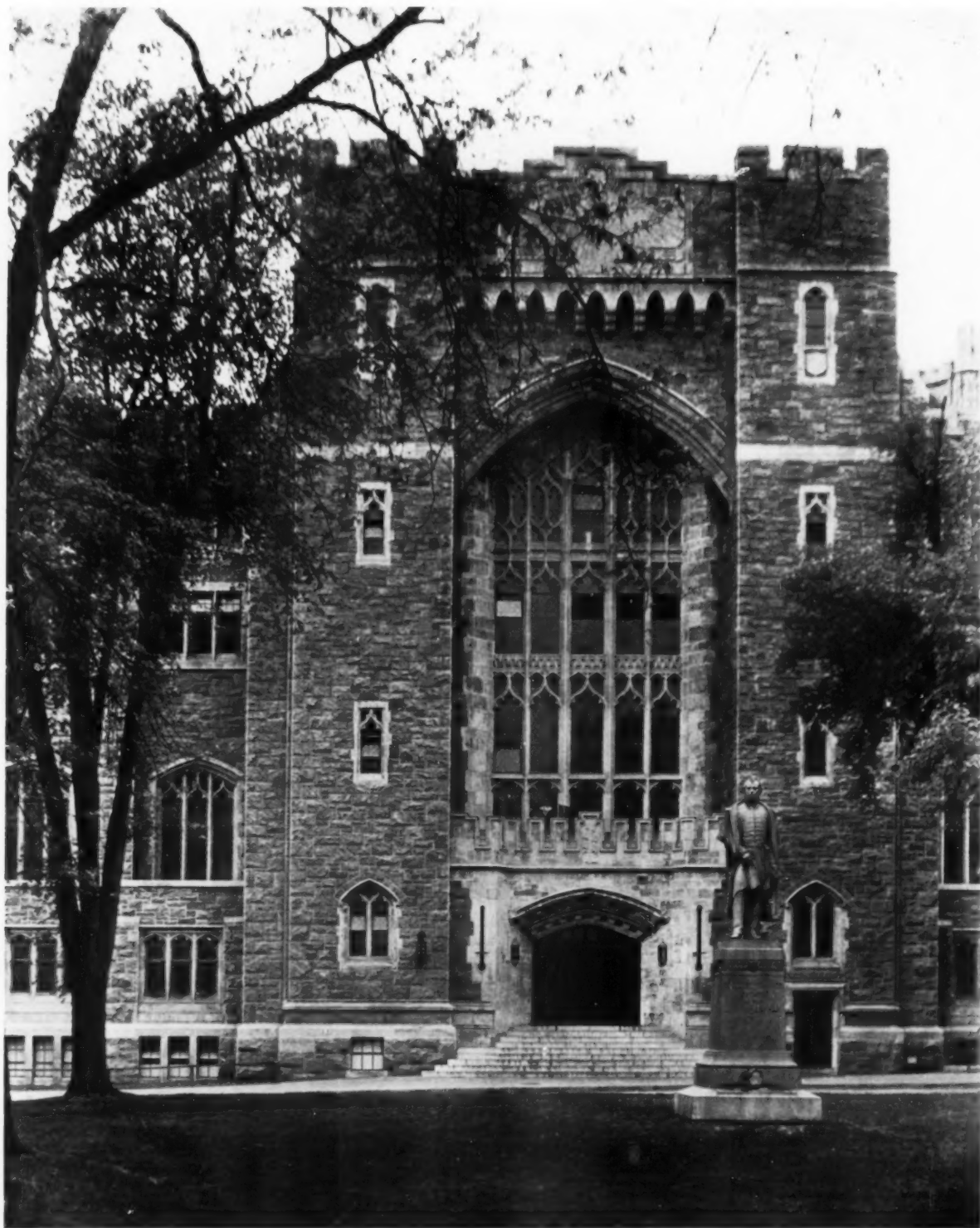


GANG SAWS

Number Five of a series of twelve drawings
made at the Fletcher Quarries by Ernest Born.

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WEST POINT, NEW YORK
GEHRON AND ROSS, ARCHITECTS



THE ARCHITECTURAL RECORD

AN ILLUSTRATED
MONTHLY MAGAZINE
OF ARCHITECTURE

VOLUME 69 NUMBER 2

FEBRUARY, 1931

THE NEW MESS HALL AT WEST POINT

GEHRON AND ROSS, ARCHITECTS

By Parker Morse Hooper

The problem of designing a single mess hall sufficiently large to feed the entire corps of cadets at one sitting was complicated considerably by the peculiar shape of the plot of ground available for the carrying out of this project. As the site is a lot at the corner of two avenues on the south side of the parade ground it was necessary to design the building in the shape of the letter "V".

THE PROBLEM

It was necessary to design a building containing a dining room of sufficient size to seat 1,600 cadets at one time and allow for a future increase of at least 400 cadets. Also the building had to be so designed and constructed as to provide space on two upper floors for what is known as the drawing academy or department of mechanical drawing, and for dormitory quarters for employees of the building.

CONSTRUCTION AND COST

The West Point Military Post built the new mess hall by the method of purchase and hire. To Col. E. J. Timberlake, Q.M.C., constructing quartermaster, and William Goding, superintendent of construction, belong the credit for the successful carrying out of this great project. The building, fireproof throughout, has a

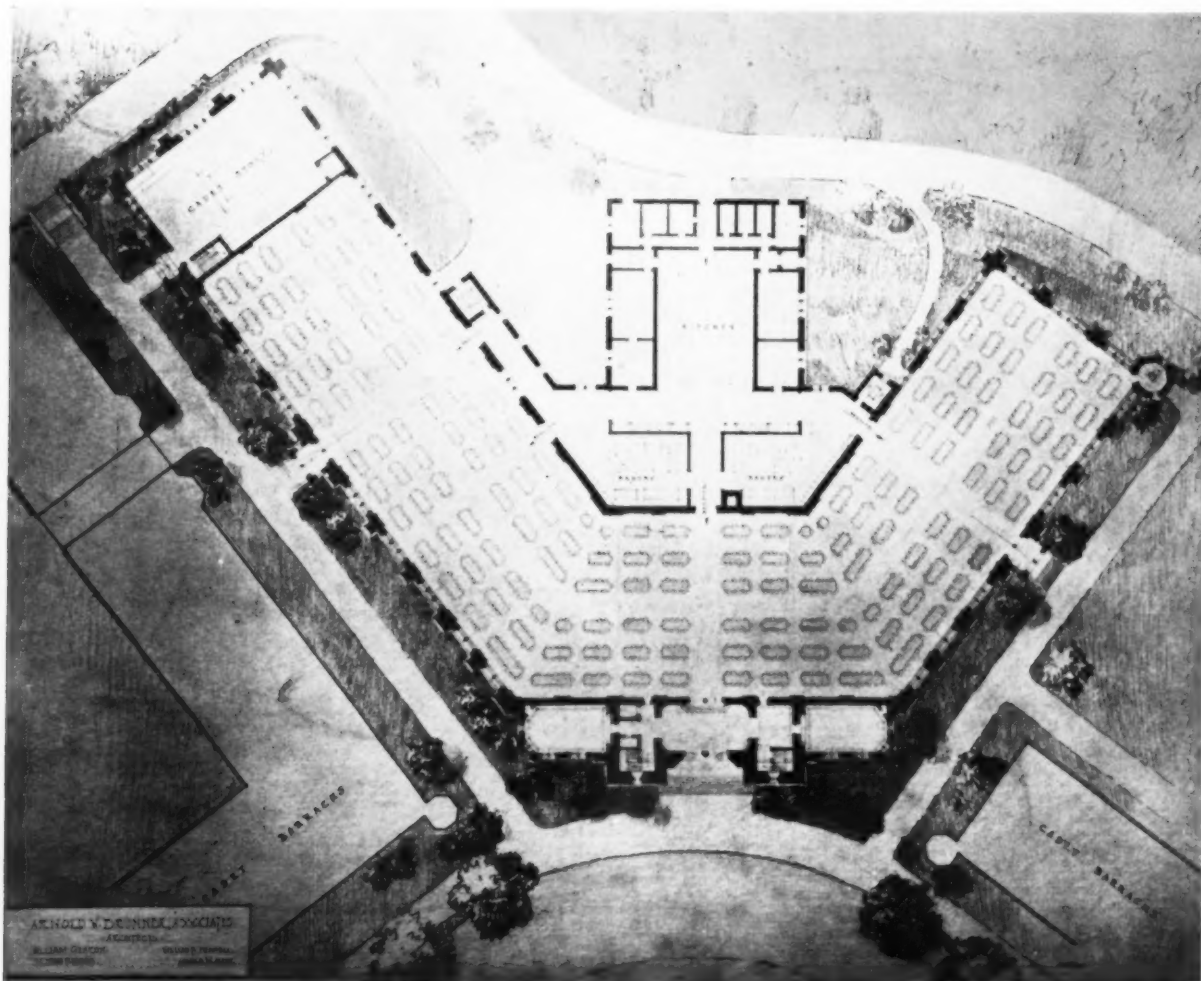
steel skeleton frame, non-bearing masonry walls and reinforced concrete floors. The roof, supported on steel rafters, is covered with slate. The building which has five stories and a basement, occupies approximately 51,000 square feet and cost the United States Government approximately \$3,000,000. The exterior walls are built of rock-faced variegated gneiss, quarried and dressed on the military reservation, and are trimmed with Indiana limestone.

DESIGN

The design of this new cadet mess hall, officially designated as Washington Hall and the largest single building at West Point, is similar in style to the other recently erected buildings. When Cram, Goodhue and Ferguson made their designs for the new West Point twenty-five years ago, they took as the inspiration for the architecture of the new buildings a simplification of the English collegiate Gothic style. In the design of this new hall, Gehron and Ross, the architects, have adapted in a pleasing and successful manner the architectural style so splendidly exemplified in the cadet chapel and the great riding hall.

ARRANGEMENT

The main feature of the building is the cadet dining hall which occupies the entire



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WEST POINT, NEW YORK
GEHRON AND ROSS, ARCHITECTS

Ground floor plan.

first floor and is entered through three large doors, located in the center and on each side. The center or main entrance opens first into a monumental vestibule with walls and fan vaulting in limestone. The massive doors are of oak with panels and moldings in Gothic design. On either side of this entrance vestibule are monumental stairways with terrazzo treads and walls in gray face-brick with limestone window coigns. At one side of these stairways is an oak-paneled visitors' room, and on the opposite side two rooms used as the office of the mess officer of the post. The great dining hall follows in plan the "V"

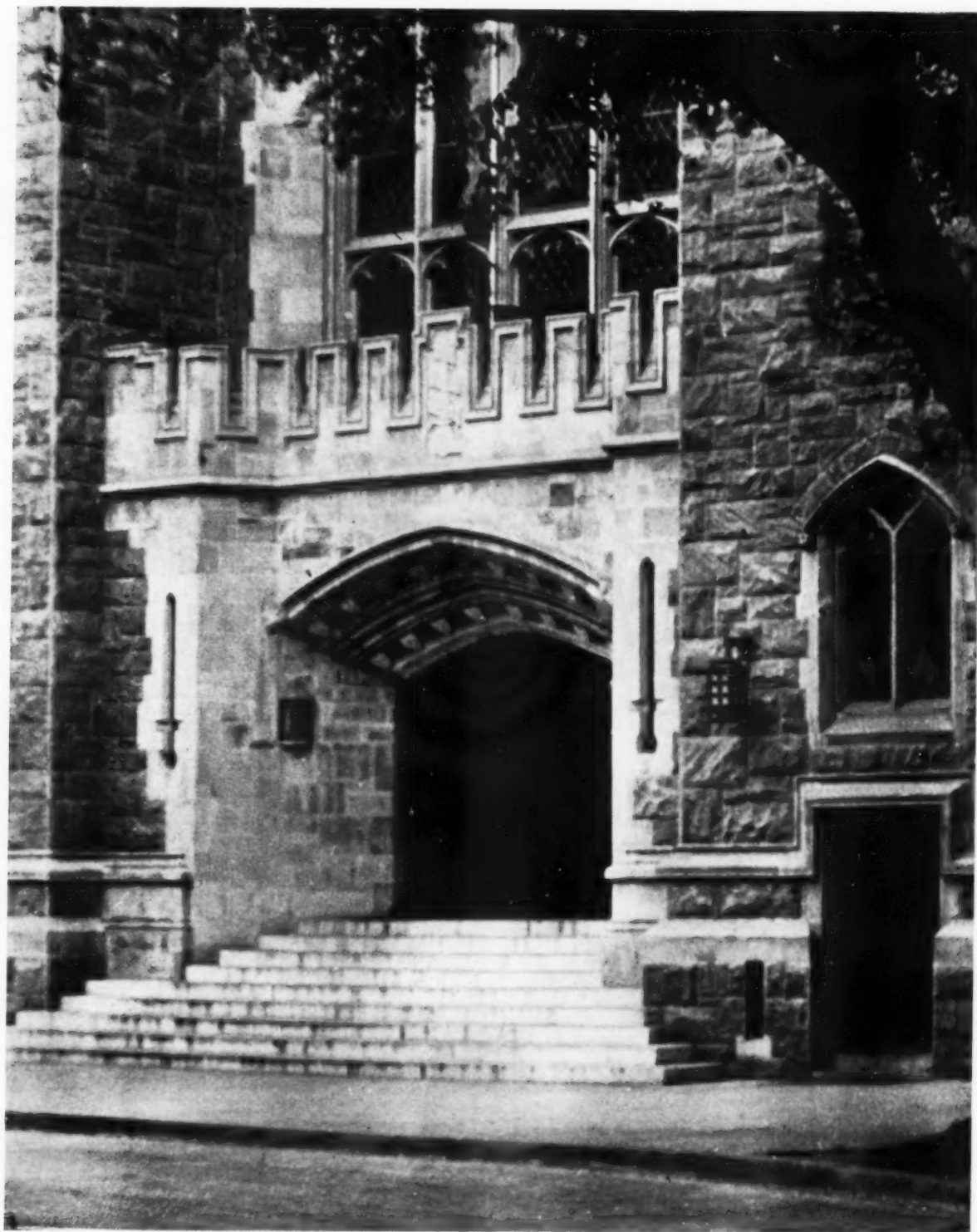
shape of the building. Each leg of the "V" is 70 feet in width and the entire length of this room is approximately 500 feet. Above a high oak wainscot which extends to the sills of the large Gothic windows the rough plaster walls rise to a height of 36 feet. The slightly splayed ceiling is decorated with large and small beams supported on massive stone corbels. The architects originally intended to decorate the ceiling in colored fresco but lack of funds prevented the execution of this work. The floor is of gray-green slate laid random ashlar. Directly back of the mess hall and located in the center of the "V"

plan is the great kitchen, square in shape with a high clerestory for light and ventilation. Two long coal ranges occupy the center of this room, containing eighteen fires, nine in each row. Along the walls are steam kettles and roasters, in front of which are eight serving tables with racks above. From the "V"-shaped mess hall there are three entrances into the kitchen. At each entrance on the kitchen side there is a coffee urn, a sink and two toasters. Grouped around the main kitchen are various rooms necessary to the successful operation of so large a culinary plant. These rooms consist of two small dining rooms for the help, a scullery with two large sinks, a general utility room with sinks, a dry grocery storeroom, a room for storing and distributing bread which is connected by a dumbwaiter with the bakery in the basement directly below it, cold rooms for the temporary storage of meat, vegetables and dairy products for each day's use, a room for preparing vegetables, and two large dishwashing rooms lighted and ventilated artificially, equipped with electric dishwashing machines, each having a battery of sinks. Also between the dining room and kitchen are located the lockers or individual cupboards for china and tableware. Each waiter is required to look after and be responsible for the china and utensils used on his own table. This arrangement saves much breakage and loss in the china and silverware. In all rooms in the kitchen department on both the main floor and the basement the walls are faced with cream-white glazed terra cotta blocks 7" x 12" x 4", and all of the floors are covered with 6" x 6" red quarry tile, supplied with occasional floor drains.

Although designed principally to house the mess hall and culinary department, this building also contains the cadet store with its salesroom, tailor shop, cobbler shop and other activities, at the extreme left end of the building. On the fourth floor, which is directly above the dining room, are storage and filing rooms with a small

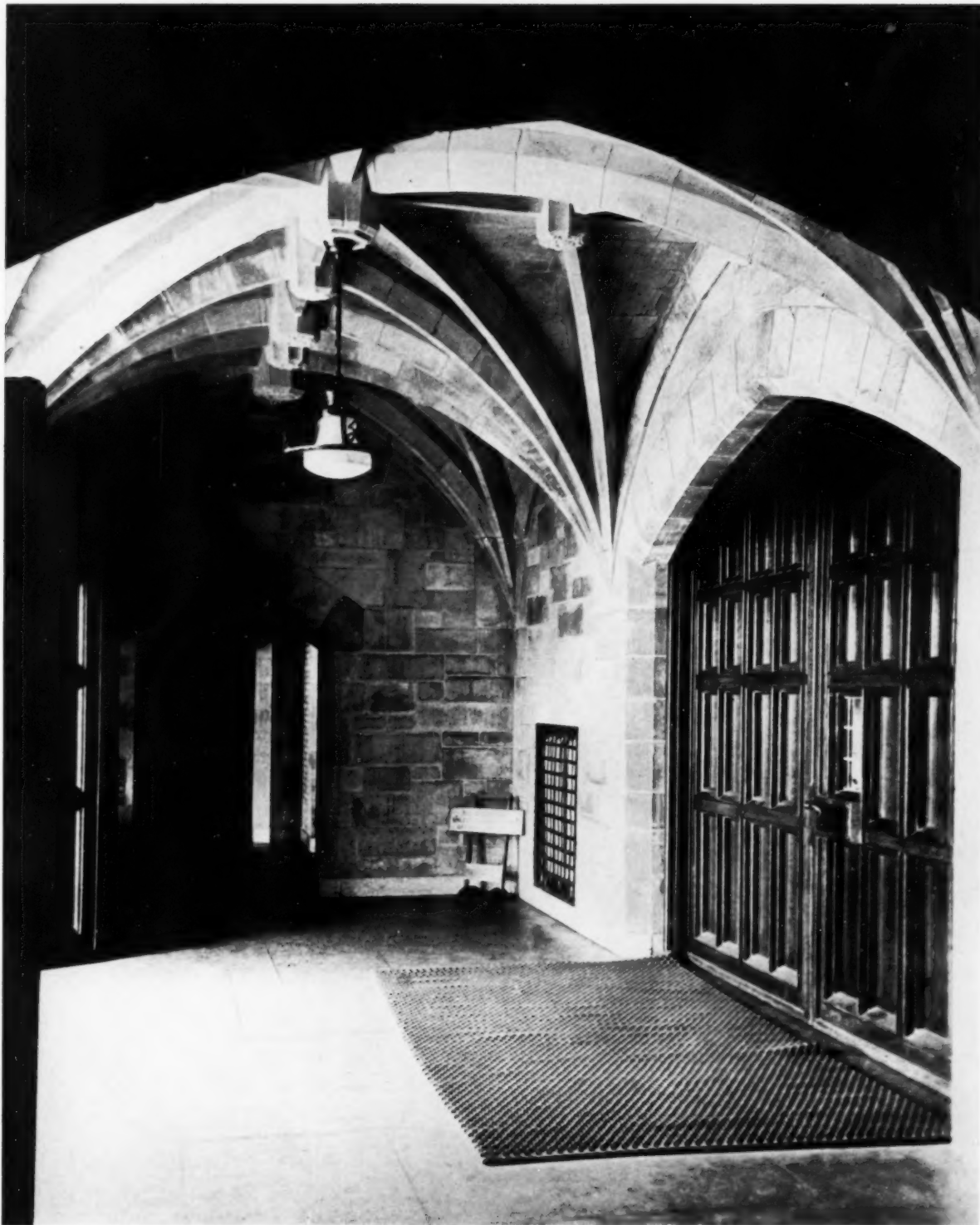
kitchen, rest room and dining room for both men and women employees of this department. Space is also provided on this floor for dormitories for the use of visiting athletic teams as well as the male employees of the mess hall. Connected with the ten small dormitories are toilets and showers, storerooms and a central living room. On the fifth floor the tailoring department occupies the extreme left end, which is entirely shut off by a fireproof partition from the two large drafting rooms. At the center of this floor is a large lecture hall in which the seats are arranged in radial banks similar to those in operating theatres. Back of the central desk is a blackboard and rolling picture screen. Adjacent to this lecture hall are rooms containing complete facilities for photographic work, a library, conference rooms, instructors' rooms, a professor's office and private toilets. On the sixth floor the upper part of the lecture hall occupies the center. At the top of this hall above the last row of seats is located the moving picture room which projects outside the building and is supported on huge stone corbels. Also on this floor is a map room with adjacent storage vaults. The lecture hall has a 6' 6" oak wainscoting with rough plaster walls above. In the plaster walls picture hook openings are counter-sunk at different levels to be used for hanging exhibitions of photographs or drawings. A large skylight illuminates this lecture hall. Four stairways and four elevators are included in the plan.

The basement is occupied almost entirely by the culinary department. Here are such rooms as the bakery with two ovens, a bread storage room and pantry with dumbwaiters, the steward's office, lavatories and locker rooms for the waiters and kitchen employees, a service elevator and service stairway, a butcher's room, linen room, vegetable preparing room, vegetable storeroom, bins for the storage of range coal with a lift to the kitchen above, and a service driveway through the basement for the delivery of supplies.



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Detail of entrance.



Gilksen

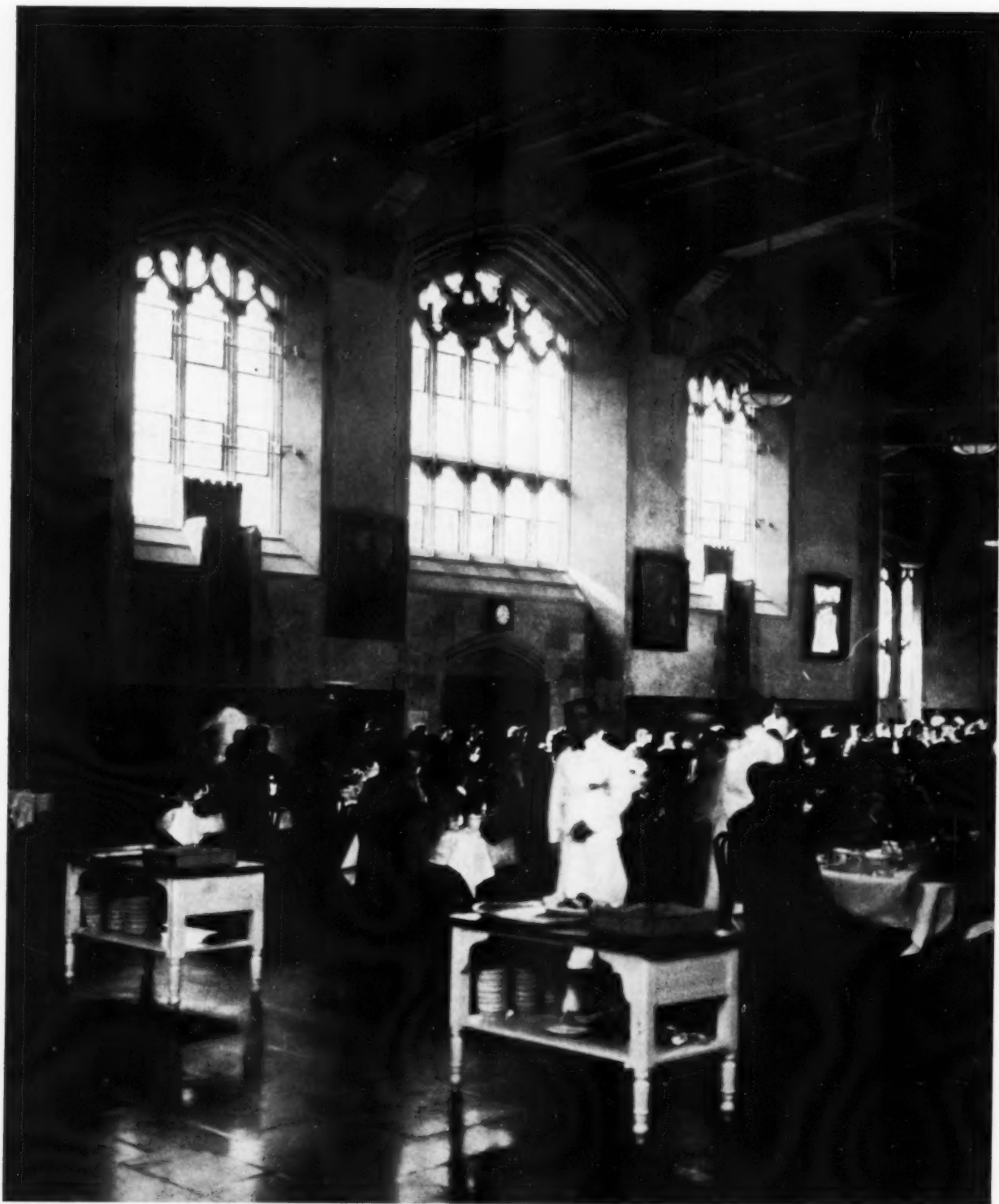
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Main entrance vestibule.

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THE ARCHITECTURAL RECORD
FEBRUARY, 1931





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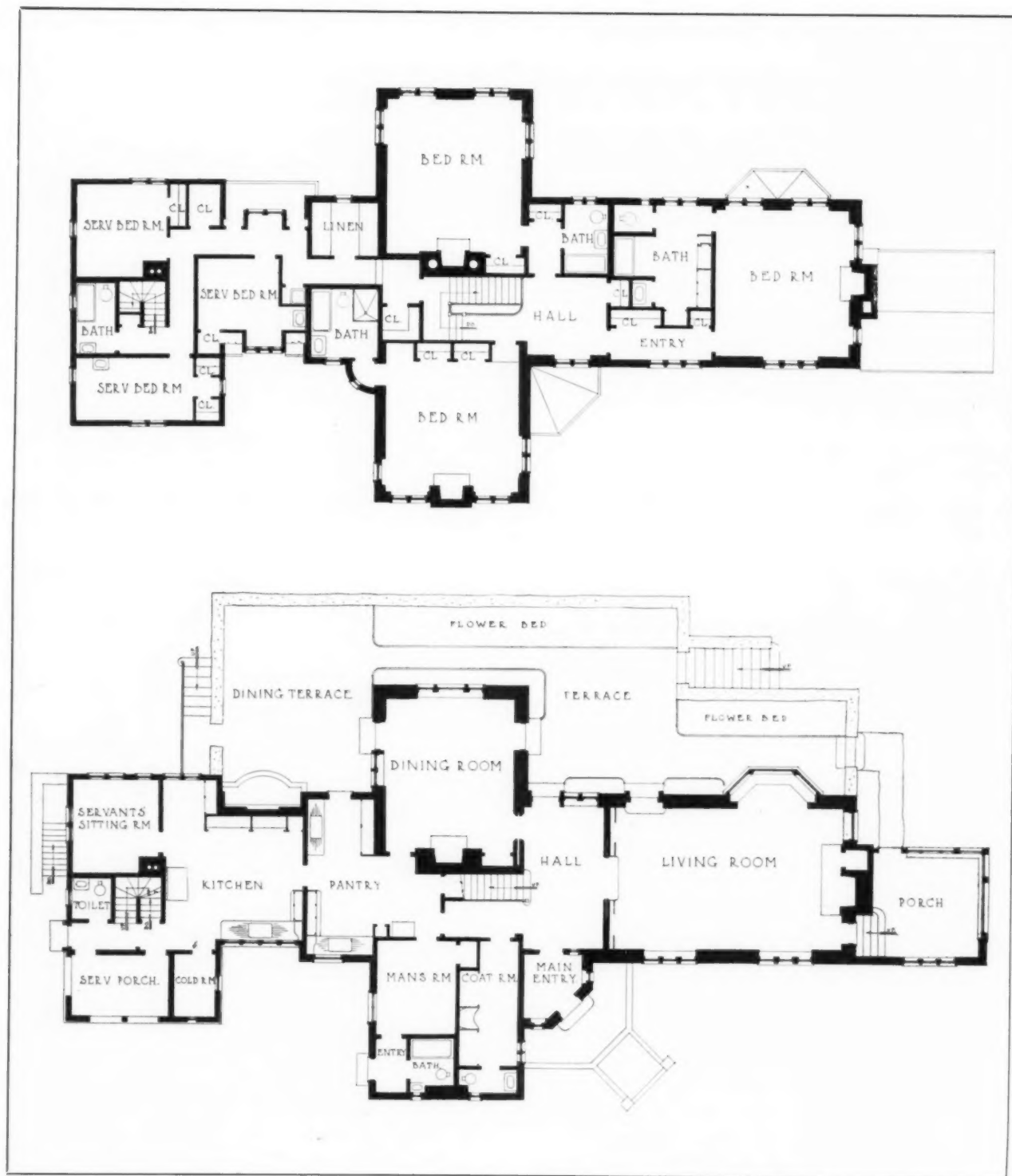
Foyer at entrance
to lecture room.

PORTFOLIO OF CURRENT ARCHITECTURE



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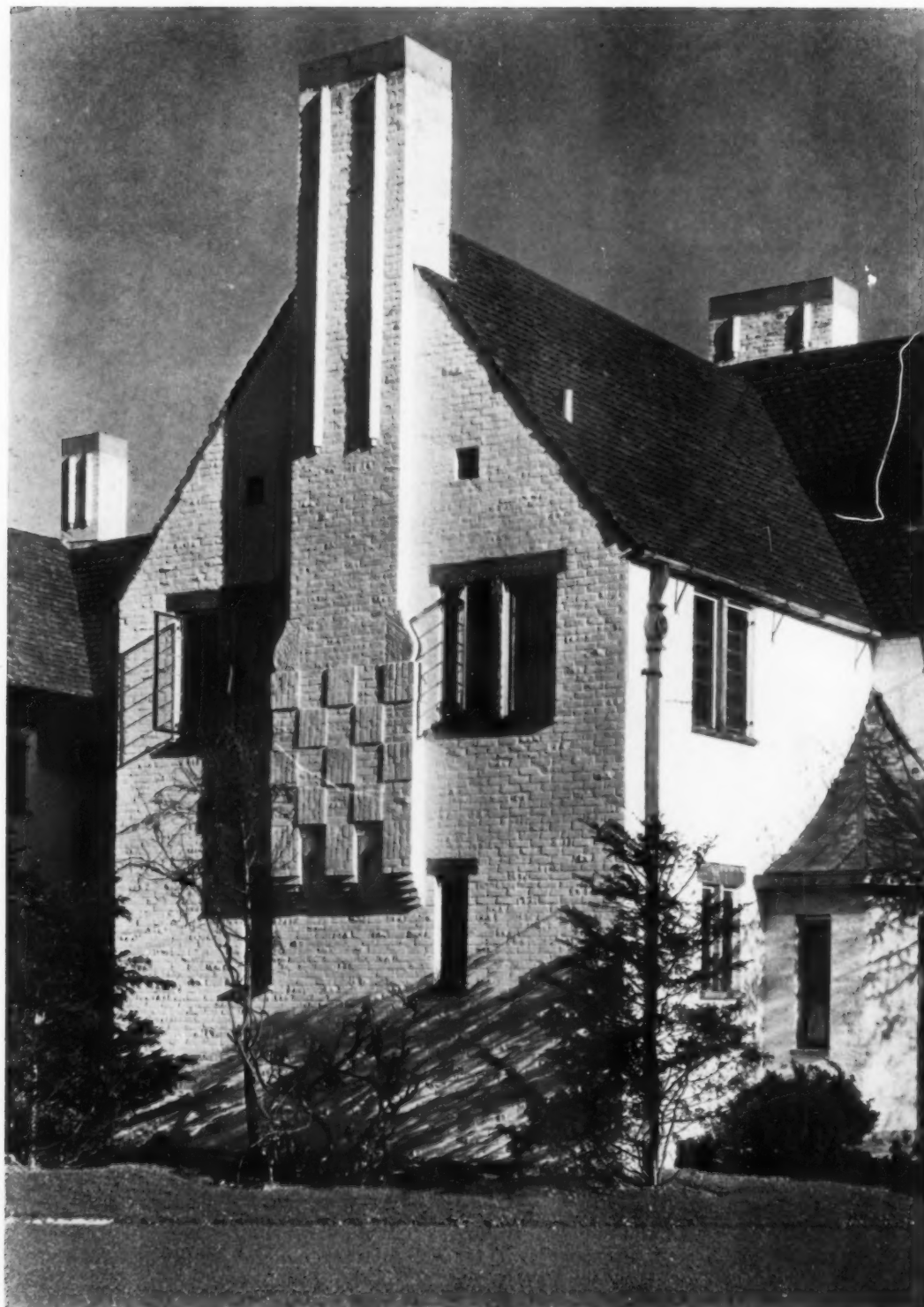


HOUSE OF F. S. SMITHERS
 GREENWICH, CONNECTICUT
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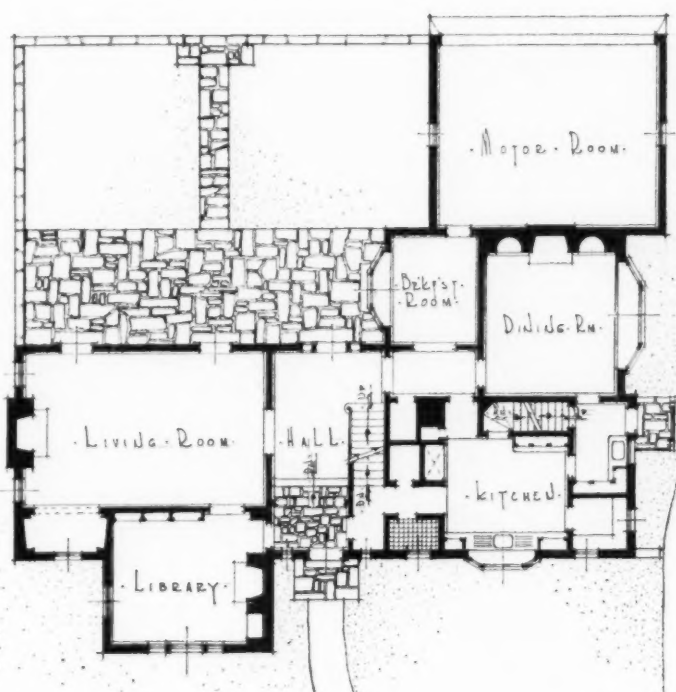


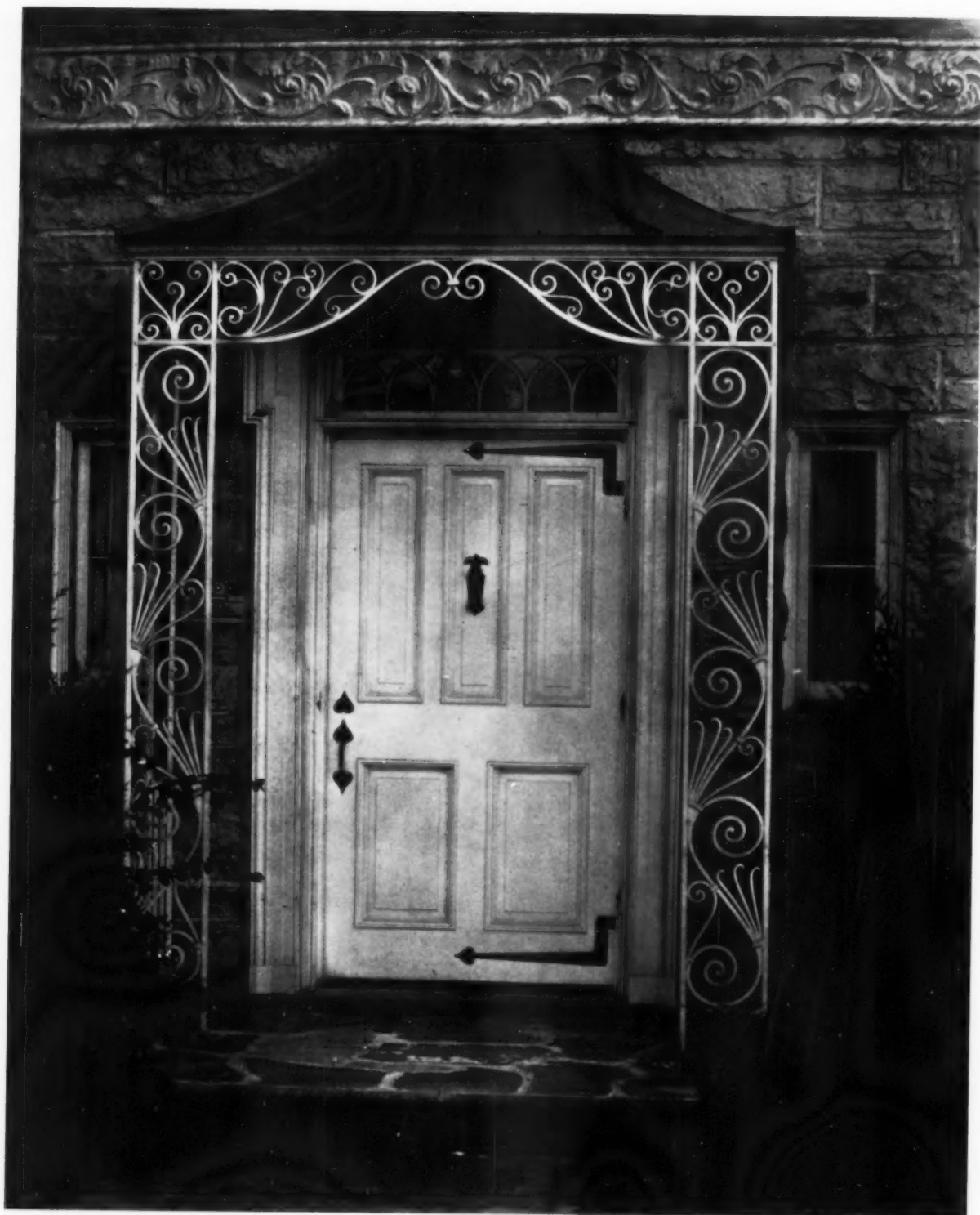
Grassie

HOUSE OF F. S. SMITHERS
GREENWICH, CONNECTICUT
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HOUSE OF MR. AND MRS. L. M. GUNDERSEN
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HOUSE OF MR. AND MRS. L. M. GUNDERSEN
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Dreyer

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DARIEN, CONNECTICUT
CHARLES S. KEEFE, ARCHITECT

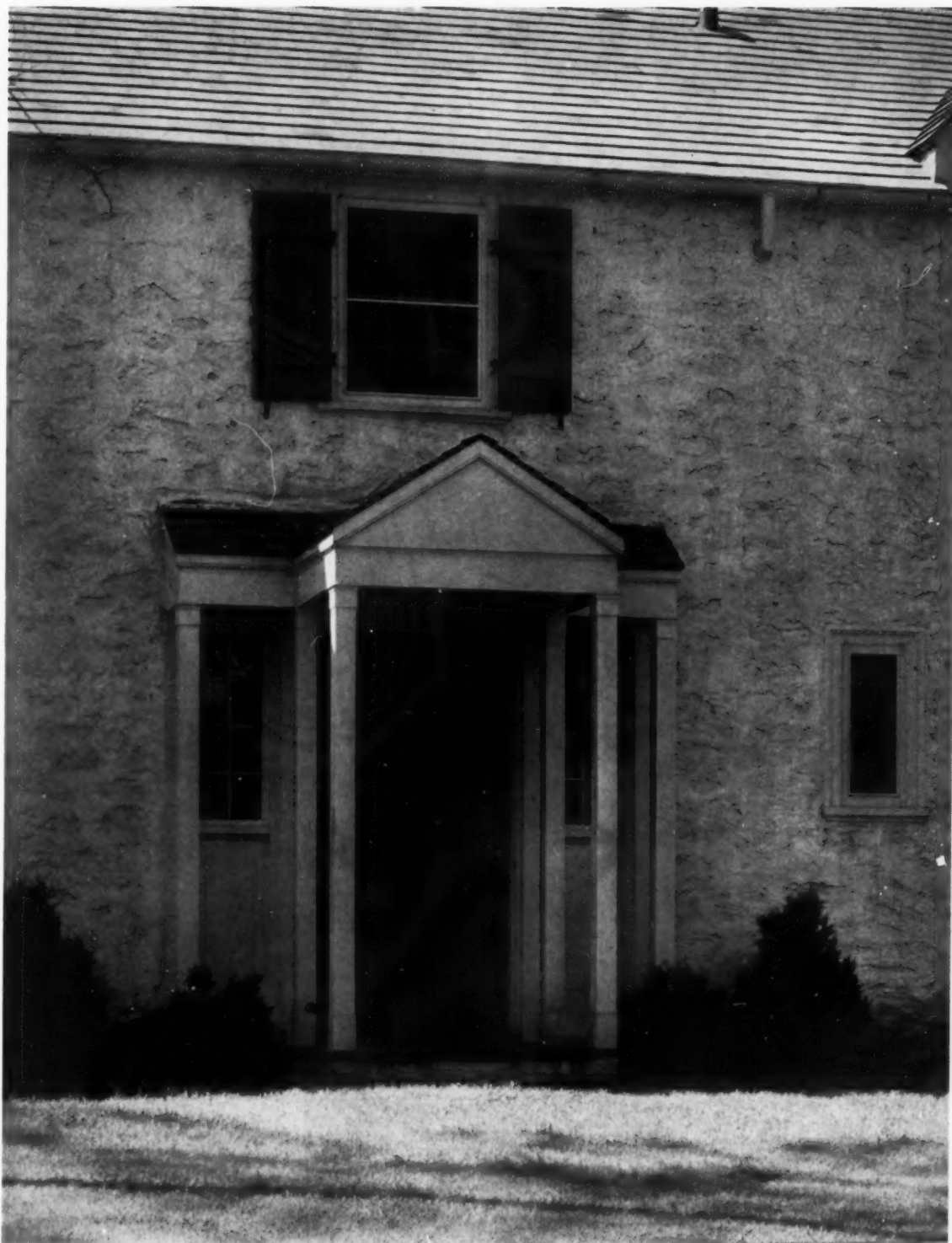
Entrance front.



Dreyer

HOUSE OF GEORGE E. STEVENS
DARIEN, CONNECTICUT
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Garden entrance.



Dreyer

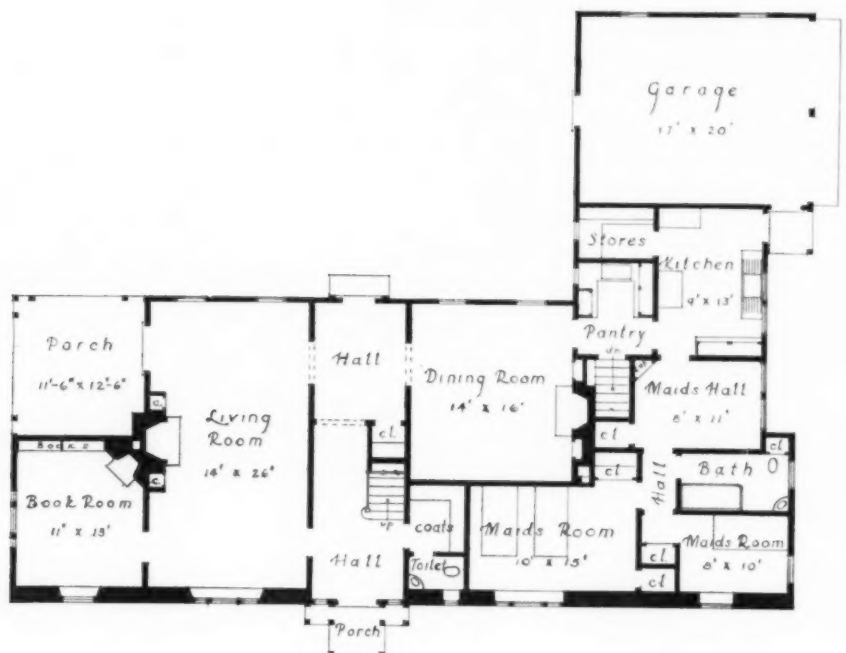
HOUSE OF GEORGE E. STEVENS
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Entrance doorway.



Dryer

HOUSE OF GEORGE E. STEVENS
DARIEN, CONNECTICUT
CHARLES S. KEEFE, ARCHITECT





Dreyer

HOUSE OF GEORGE E. STEVENS
DARIEN, CONNECTICUT
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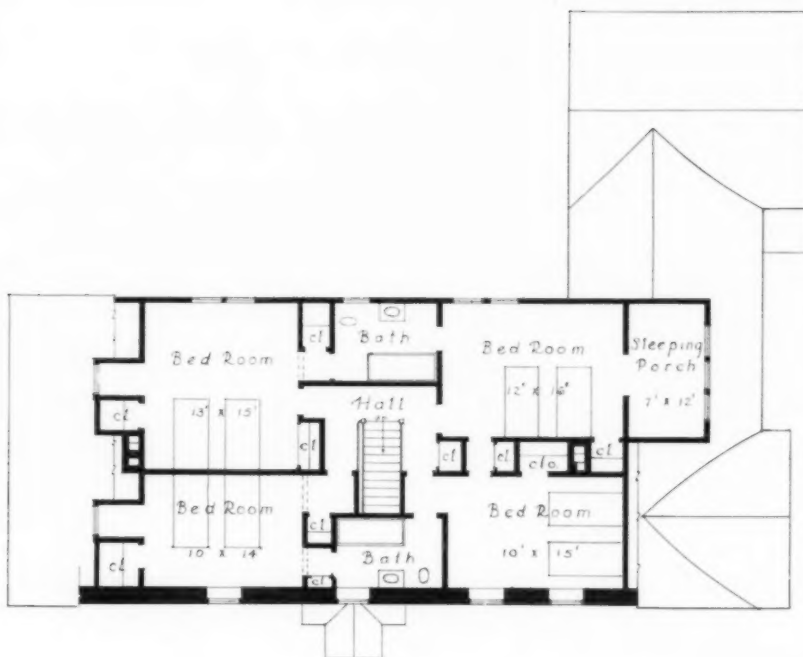
Garage and service entrance.



Dreyer

HOUSE OF GEORGE E. STEVENS
DARIEN, CONNECTICUT
CHARLES S. KEEFE ARCHITECT

Dining room.





Dreyer

HOUSE OF GEORGE E. STEVENS
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Living room fireplace.



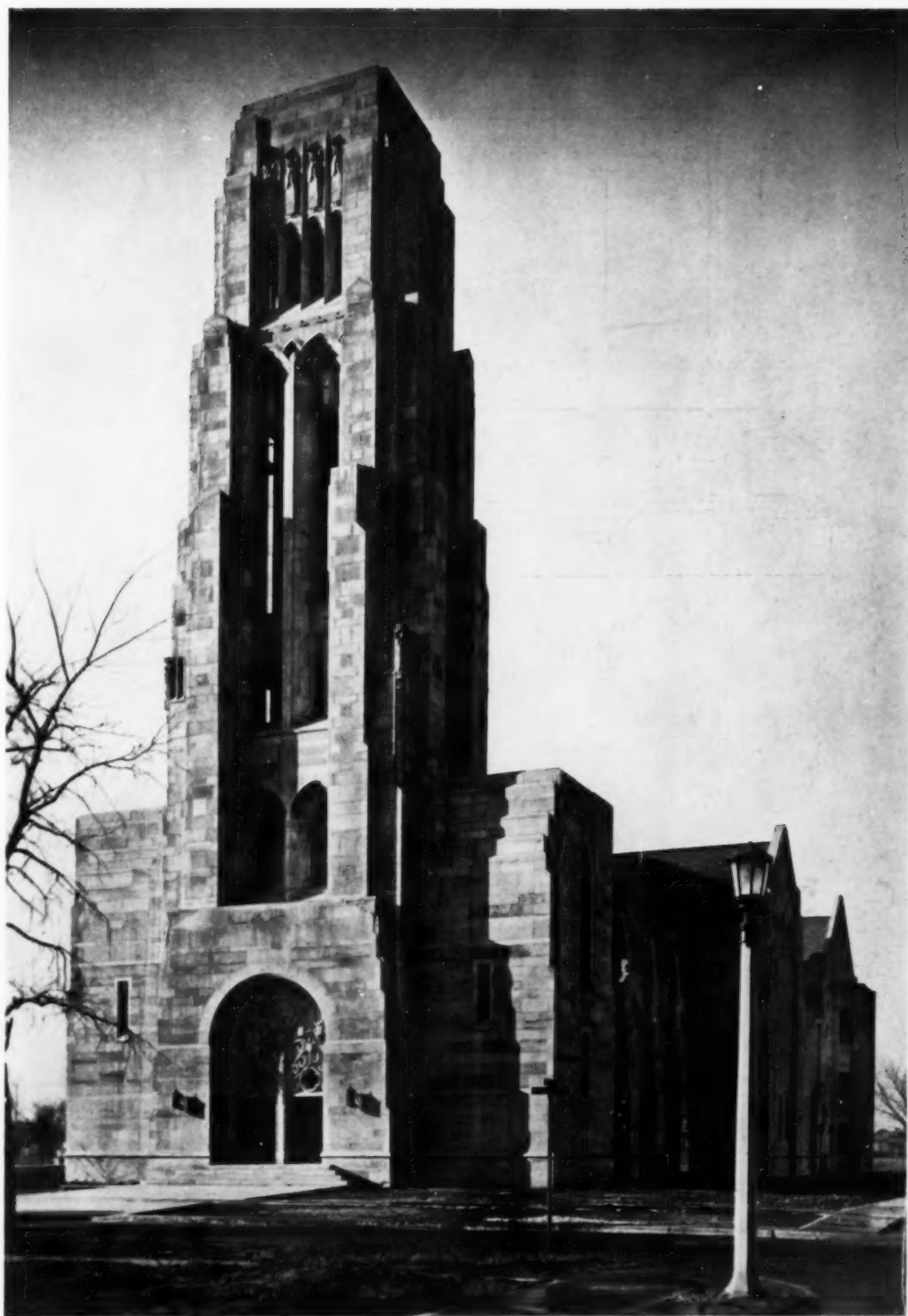
Sculpture executed by David Evans, sculptor, while instructing at Cranbrook Academy of Art, Cranbrook, Michigan, 1929-1930.

"CHRIST IN PRAYER"
CHRIST CHURCH
CRANBROOK, MICHIGAN

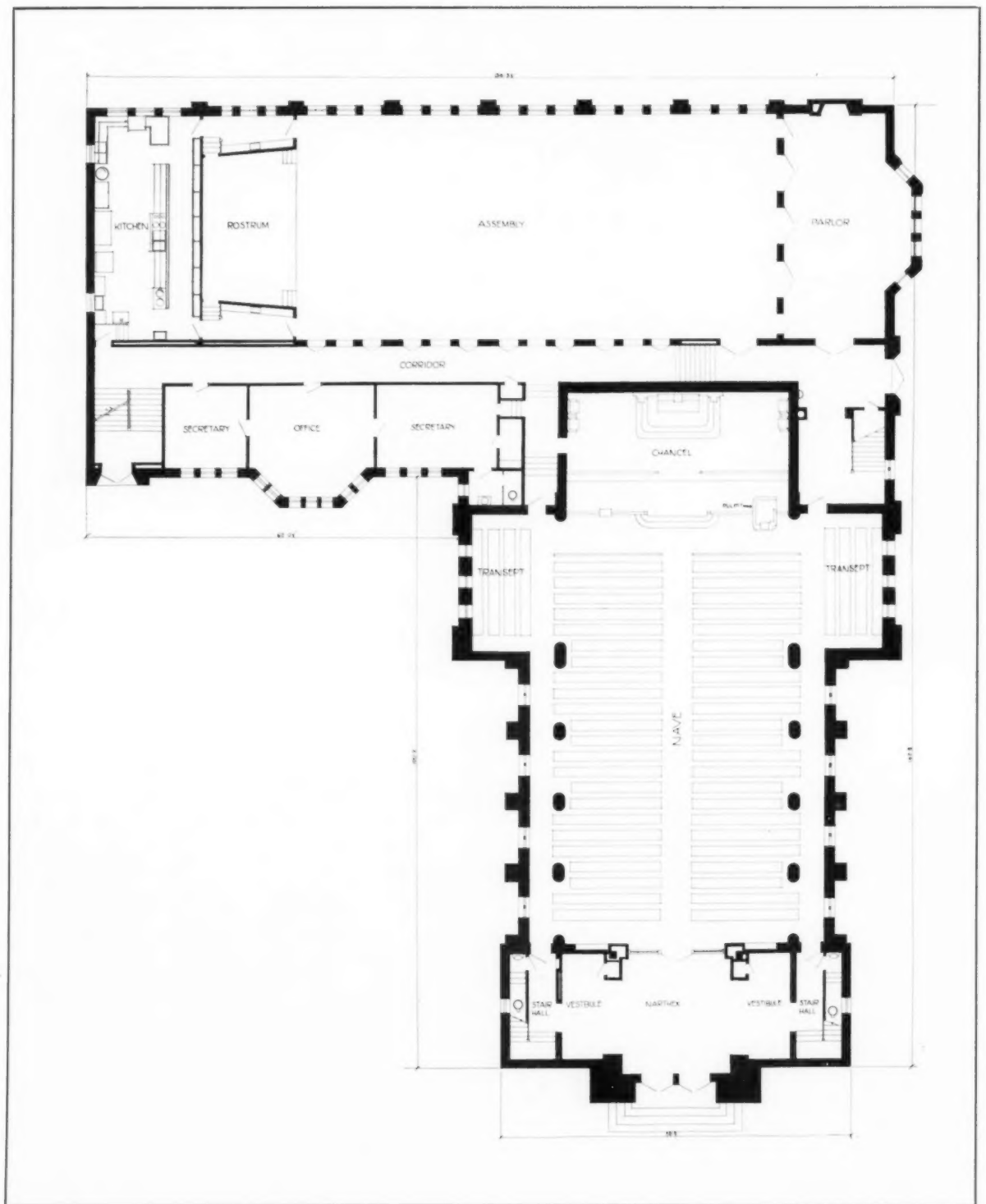


Arnold Studio

"FOOTBALL" A RELIEF IN BRONZE
ERECTED AT CRANBROOK SCHOOL FOR BOYS, MICHIGAN



GRACE EVANGELICAL LUTHERAN CHURCH
RIVER FOREST, ILLINOIS
TALLMADGE AND WATSON, ARCHITECTS

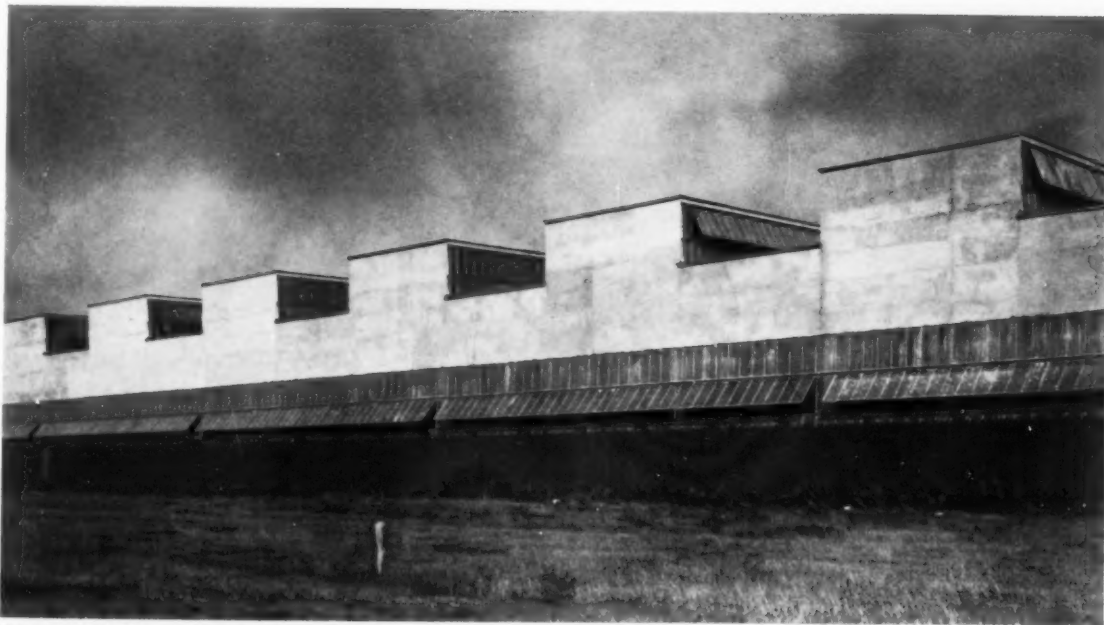


GRACE EVANGELICAL LUTHERAN CHURCH
RIVER FOREST, ILLINOIS
TALLMADGE AND WATSON, ARCHITECTS



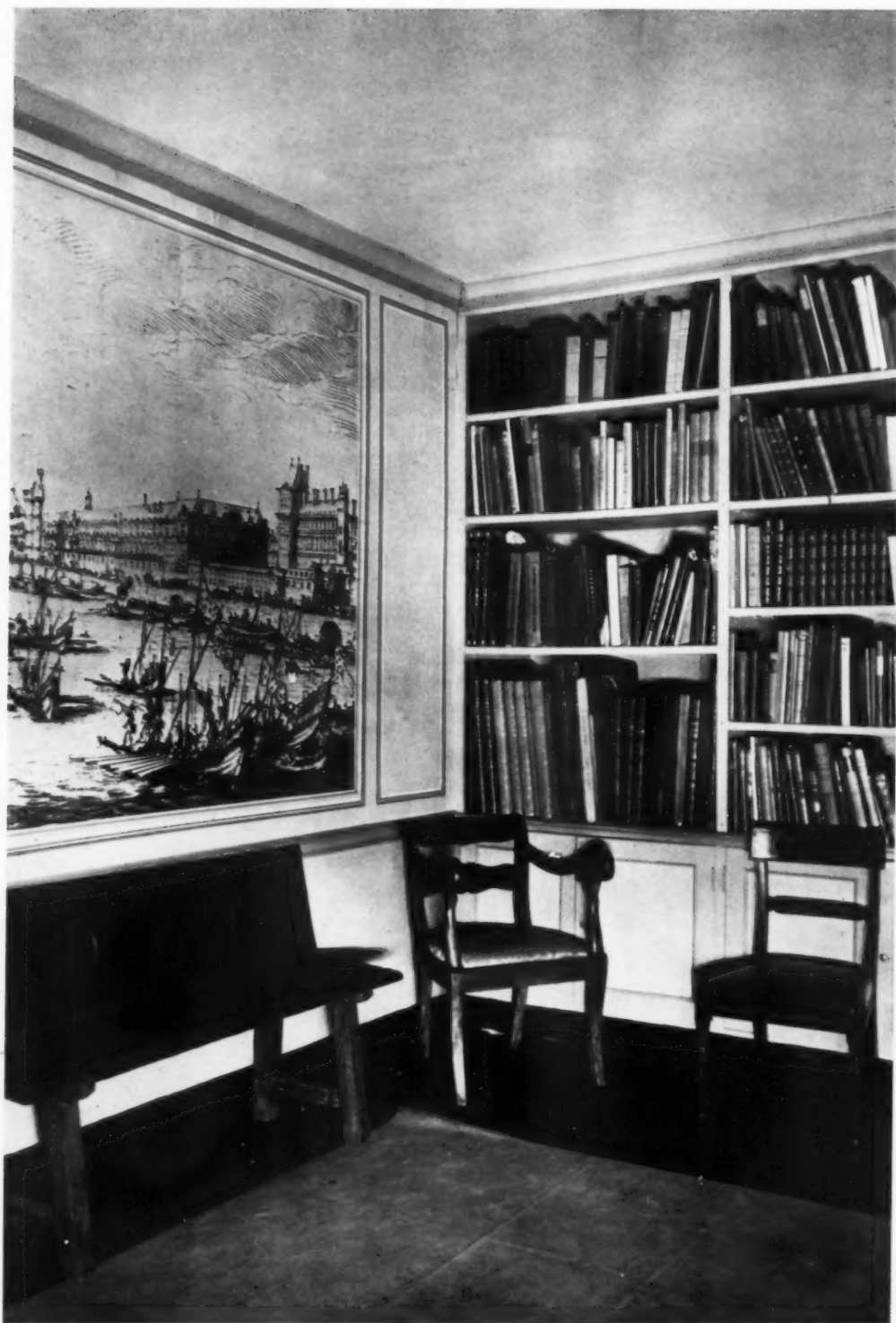
Morgan

PRODUCE TERMINAL
LOS ANGELES



Detroit Steel Products Co.

FOUNDRY, NATIONAL MALLEABLE CASTING CO.
CHICAGO



Van Ande

LIBRARY IN NEW YORK OFFICE OF
ROBERT PERRY RODGERS AND ALFRED EASTON POOR, ARCHITECTS



Van Anda

OFFICE FOR LITTLE, BROWN AND CO., PUBLISHERS
NEW YORK CITY
ROBERT PERRY RODGERS AND ALFRED EASTON POOR, ARCHITECTS



Gettsche

A DRUG STORE THAT OPERATES A RESTAURANT

ELY JACQUES KAHN, ARCHITECT

By Otto Teegen

The Broadmoor Pharmacy, located in the Lefcourt-Colonial Building at 41st Street and Madison Avenue, is essentially a drug store and restaurant. The drug store occupies a portion of the first floor while the entire basement is given over to the grill and tea room, kitchens and pantry. A wide staircase connects the upper floor with the lower and is the only means of communication between the two. Since the area was leased when the building was almost completed, there were many obstacles to be overcome, not only in the disposition of the plan but in the matter of pipes and ducts coming from all parts of the building and centering on the basement ceiling.

The drug store has two entrances, one from the street, the other from the building's main elevator hall. Although actually not of great dimensions, the store gives an impression of spaciousness with a straightforward communication to the main staircase. The walls are paneled to a 14-foot height

with Oriental walnut cross-grained in approximately 15" squares. A 6" base of Vermont Verde Antique connects the wood paneling with the patterned marble terrazzo floor of Botticino and Cardiff green. The ceiling, with a molded plaster cove, is tinted an ivory cream, and from it are suspended six ceiling fixtures providing ample light even when the soffits of the various fountain reveals and display cases are not lighted. The south wall is perforated with built-in display cases which have sliding glass doors with metal frames; these are lined with mirrors and lighted through frosted glass soffits. All the metal used throughout the interior is chromium-plated with a satin finish. The north and east sides of the store are used for the soda fountain. The counter itself is faced with Oriental walnut and has thirty stationary stools upholstered with leather. A 9" step at the base of the counter provides a much-to-be-desired comfortable foot rest. The space between the structural columns was used for soda



Gottlieb

BROADMOOR PHARMACY AND RESTAURANT
NEW YORK CITY
ELY JACQUES KAHN, ARCHITECT

Men's grill.

fountain equipment, and the reveals are lined with mirrors and lighted from above through glass soffits. Small metal perforated grilles in the woodwork, placed over each lighted soffit, become decorative features as well as means to ventilate. There is no forced ventilation on the first floor.

The staircase, leading to the restaurant below, is approximately 10 feet wide and faced with Botticino marble; the steps have Botticino risers and Travertine treads. It terminates in the foyer and is on axis with the small waiting room, with walls of plaster painted in three shades of warm sienna and a floor of green terrazzo in pattern. The foyer is paneled in Oriental walnut, the ceiling is of plaster and has a central lighting fixture, and the floor is of terrazzo laid up in alternate squares of Levanto and yellow Verona. Two recesses on each side of its length have mirror backs and are lighted through glass soffits. From the foyer one passes directly to the grill and tea rooms.

The main portion of the grill room is about 60 feet square and built around the four central columns. The ceiling height of this portion is 12 feet, and in the molded plaster frieze below it are placed the ventilating louvres. Because of ducts and pipes, the rest of the room was brought down to a 9-foot height or the total height of the woodwork. The lower part of this has a 3-foot rosewood base and chair rail, while the upper part is of American walnut with 4" rosewood strips. The four center columns are of American walnut with 2" vertical rosewood strips terminating in lighting fixtures. On the plaster ceiling are other fixtures with painted border decorations, while some light is provided by wall brackets. All these fixtures, made by Walter Kantack, are of lacquered brass and particularly interesting because no castings, but only standard rolled sections, were used in their manufacture. The floor is of terrazzo laid in pattern, and the marble base adjoining it is of Vermont Verde Antique. This



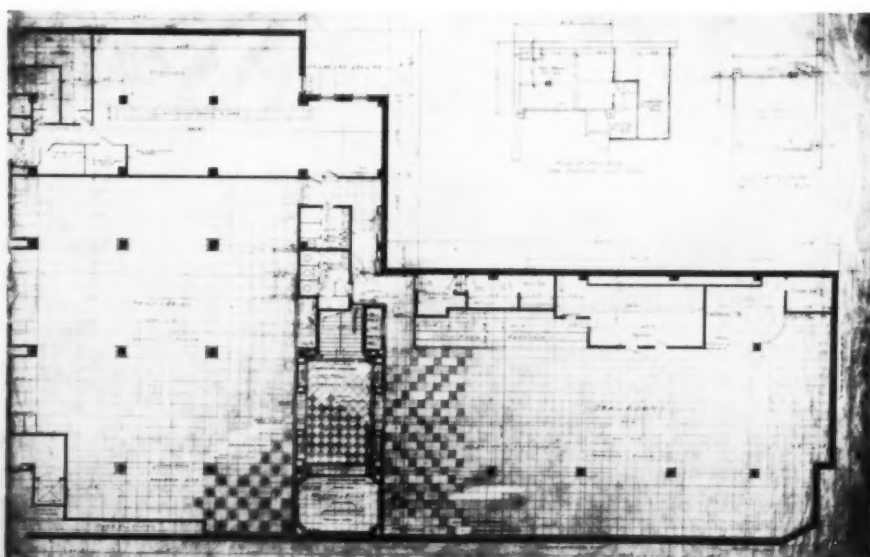
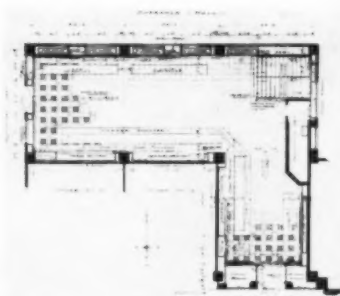
Gottsche

BROADMOOR PHARMACY AND RESTAURANT
NEW YORK CITY
ELY JACQUES KAHN, ARCHITECT

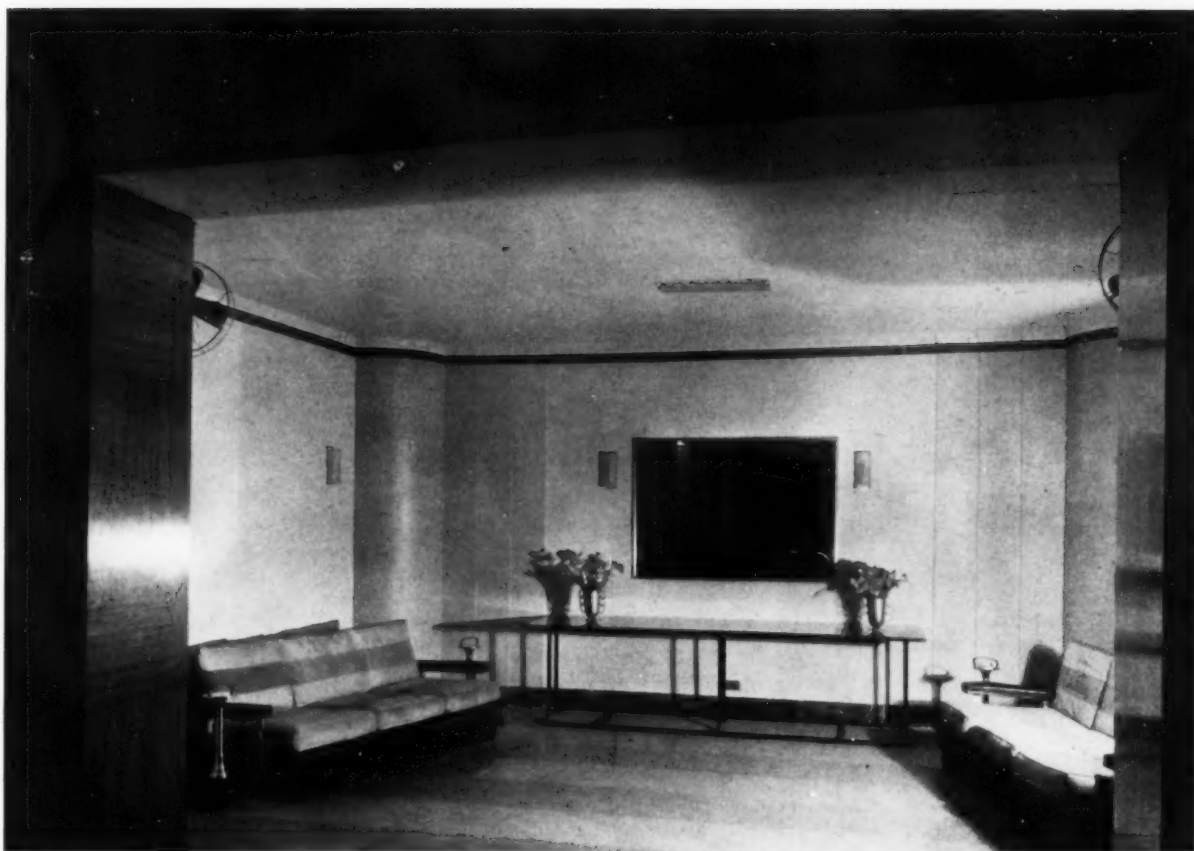
Stair foyer with view of
men's grill to left.

Basement plan: kitchen,
men's grill, tea room, wait-
ing room and stair foyer. ➔

Ground floor plan: phar-
macy and stairs. ⬇



Both plans in same scale.



Gettische

BROADMOOR PHARMACY AND RESTAURANT
NEW YORK CITY
ELY JACQUES KAHN, ARCHITECT

Waiting room opposite stairs
and between men's grill and
tea room.

room at present seats 400. Both the chairs and tables are of a simple design, the wood being colored light yellow and the Fabricoid upholstery of the chairs vermillion.

The tea room is very light and gay. Except for the chair rail, small ceiling cornice and the soda fountain front, no wood was used. The five free standing structural columns were faced with mirrors down to the chair rail, and on the walls, at intervals, other large mirrors were placed. The spaces between these mirrors are of plaster and have received treatment in color by Putnam Brinley. On either side of each wall mirror are lighting brackets, while from the plaster ceiling are suspended lighting fixtures, the metal parts of which are lacquered in green and black; an etched glass bottom allows some direct light although the lighting of the room on the whole is indirect. The furniture in this room is of the same color and material as that used in the grill with the exception of the tables which have a vermillion top covered by a sheet of glass. The floor is of green and

black terrazzo laid in pattern. Service for this room, at present with a capacity of 400 chairs, is provided by the kitchen and augmented by a pantry located on the south side adjoining a long soda fountain which seats 16. The communication to and from the pantry and kitchen is direct and efficient. A back staircase, leading from the room to the main lobby upstairs, has been provided, but it is little used inasmuch as the main staircase is adequate and more convenient.

Although the area of the kitchen and pantry may seem on plan rather confined, its equipment has been so arranged that it is entirely adequate to provide the 1,500 patrons who crowd the grill and tea room each noon. In conjunction with it are store and refrigerator rooms and the help's locker rooms. Only women are used in the kitchen. At the moment there are thirty of these, sixty-eight waitresses, and twelve fountain men, besides various hostesses and cashiers.



Gateway

Rooms expand on the same floor level and require windows arranged horizontally. This principle is clearly illustrated by the night lighting of the Daily News Building, New York City. The normal horizontal movement is interrupted by vertical bands which are unnecessary with steel construction. John Mead Howells and Raymond Hood, Architects.

WINDOWS

By A. LAWRENCE KOCHER and ALBERT FREY

Good architecture is not dependent upon window shapes. Windows should be given sizes and proportions that are suitable to daylighting needs.

The primary purpose of windows is to provide daylight and ventilation to building interiors. Windows should also permit unobstructed view of surroundings. To aid requirements of view the glazed area should be without division bars unless structurally necessary.

Physicians and illumination engineers have consistently called attention to the value of daylight, particularly of sunlight, but "how it really acts and how its benefits can most practically be secured we are just beginning to comprehend."* The Metropolitan Life Insurance Company in its Statistical Bulletin has made a tabulation of data regarding deaths found in a random selection of records of the 40,000,000 risks which it has carried . . . "and found that death rates are higher during the darker winter months than at any other time of the year and that the low death rates are found during the summer months." ‡

Windows should be designed to make usable a maximum of floor space with evenly distributed daylight. Light needs are the basis for determining window sizes and their placement. These needs can be determined by the use to which floor space is put. Thoughtful investigation by the architect with advice of technical illumination experts is essential. It is obvious, as an example, that the laboratory where microscopic work is carried on requires more light than the room for library book storage, where light is injurious to bindings. Light for general office work requires approximately ten foot candles† of intensity at a desk level, thirty inches above the floor. We are informed by experience tests that our "seeing improves with increase in illumination. Speed of vision and accuracy of sight increases. Ocular fatigue decreases." ‡

One of the most astonishing discoveries of lighting experts is the fact that the room flooded with daylight from an entire wall of glass is more satisfactory for working and less disturbing to the eye than the room with light from a single moderate size window. In other words, the greater the glass area the more favorable the working conditions will be. This phenomenon is checked by daily experience. There is no significant eye strain in reading on a

porch that is open on three sides but there is eye strain in typing or reading in a room with light from a single window that is surrounded by dark wall areas. It is essential, therefore, to seek daylight intensity that is evenly distributed, without excessively bright or dark spots. Lighting engineers offer the rule, "The brightest spot in any building should not have more than about three times the illumination of the dimmest spot in the same building."

With the increase of glazed area to a maximum, there arises the acute problem of heat loss in winter and the need to exclude the intense heat rays of summer. There is no serious difficulty in adjusting the heat to a comfortable temperature in winter by an increase in radiation. Heating has been satisfactorily solved for hospitals, greenhouses and industrial buildings.

There are more serious difficulties in the control of summer heat. Window shades with polished metal blades could be used to deflect the sun's rays and at the same time to admit some light. Awnings or shades are also effective. Ventilation by natural or artificial methods would produce the circulation needed to lower room temperature.

CHECKING LIST

Size and shape determined by daylighting needs. Should make usable a maximum of floor space. Minimum obstruction by framework and muntins. Greater glass area at base of buildings than for upper stories.

Window area should be at least 30 per cent of floor area.

Room depth should not exceed twice the window height for most satisfactory working conditions. Glass area should continue to ceiling.

Adaptability to control of light by shades.

Provision for heat control in summer.

Ease of operation.

Convenient possibilities for cleaning.

Provision for ventilation when artificial ventilation is not supplied.

Non-interference with screening when opening windows.

Freedom from air leakage.

Glass free from distortion.

Double strength glass for areas in excess of three square feet and for all glazing of printing plants and manufacturing buildings.

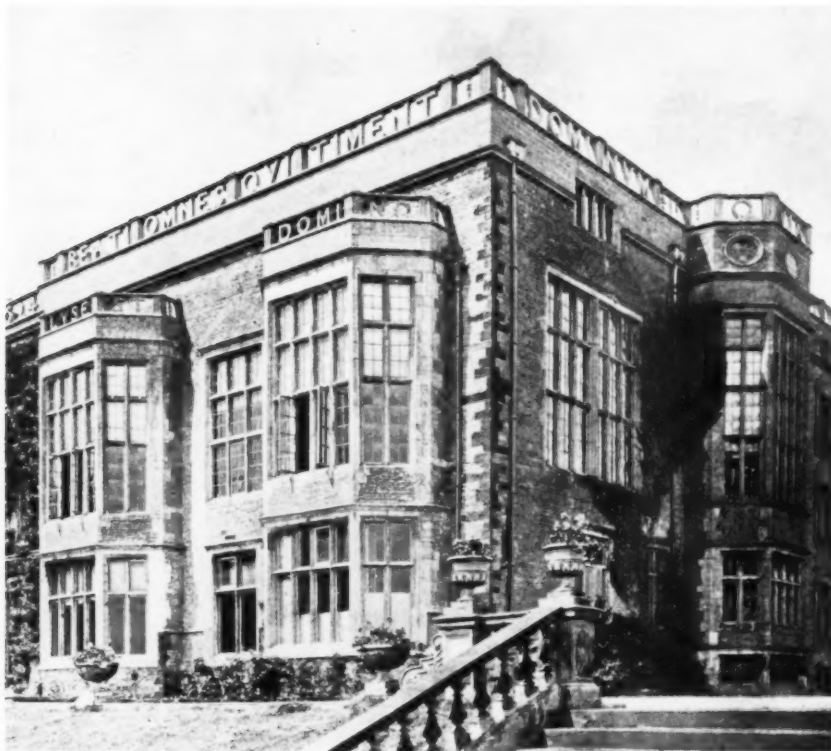
Plate glass for sizes in excess of 12 square feet.

Small glass sizes for factories on account of frequent replacement.

* Proceedings of the American Society of Civil Engineers, May, 1925, pp. 800-802.

‡ Regional-Survey of New York and its Environs, vol. VII, p. 152. † Foot candle is a measure of light quantity thrown by a standard candle on a foot square surface, one foot from candle.

‡ Industrial Daylighting, p. 5.



◀ Castle Ashby, Northamptonshire, England.

Interior, Oriel Hall, Nettlecombe Court, Somerset. ↓

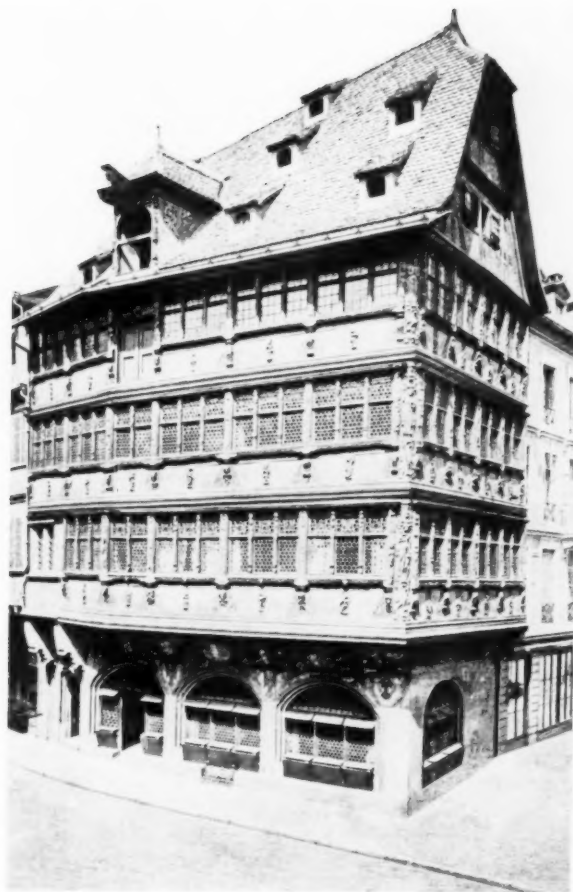
English Homes, by H. Ayray Tipping, vol. II



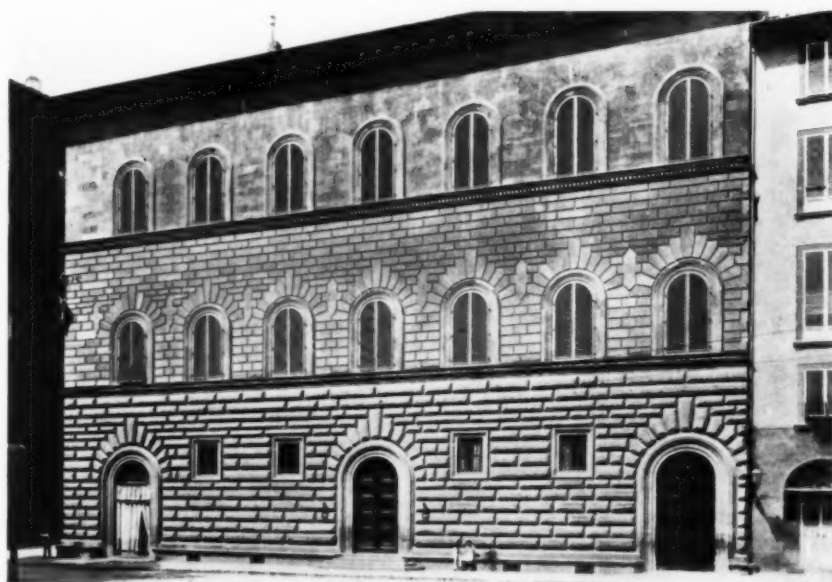
English Homes

Windows characteristic of England and northern Europe are of generous size suited to purpose and to their time. They were created so as to flood interiors with ample daylight in a region of low light intensity. Window mullions were reduced to a minimum to increase glass area.

A typical multi-storied building with continuous windows on each floor. A method of daylighting that is efficient and that conforms to the levels for work and living. The House Kammerzell, Strassburg.



Alte Deutsche Bankanstalt



Windows typical for Italy, a country with ample sunlight, were limited in size and widely spaced so as to exclude the too intense light and heat. The small window sizes, however, were sufficient for daylighting rooms. Palazzo Gondi, Florence.

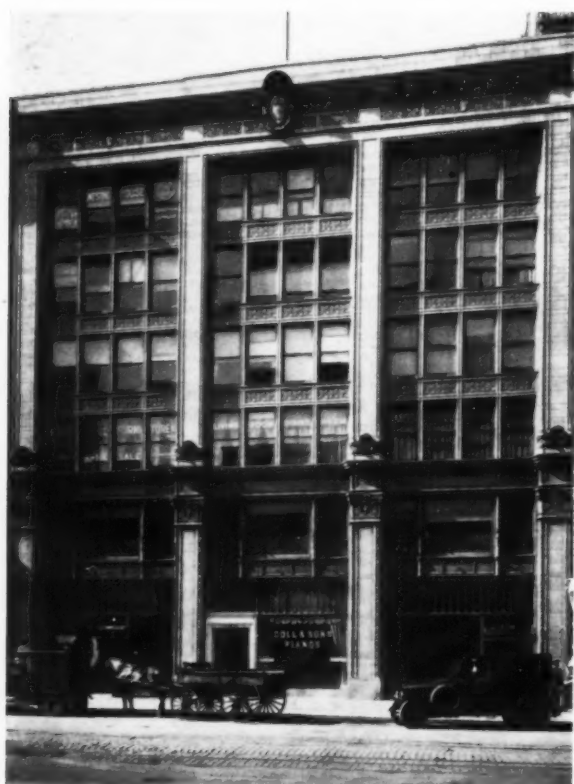


English Homes

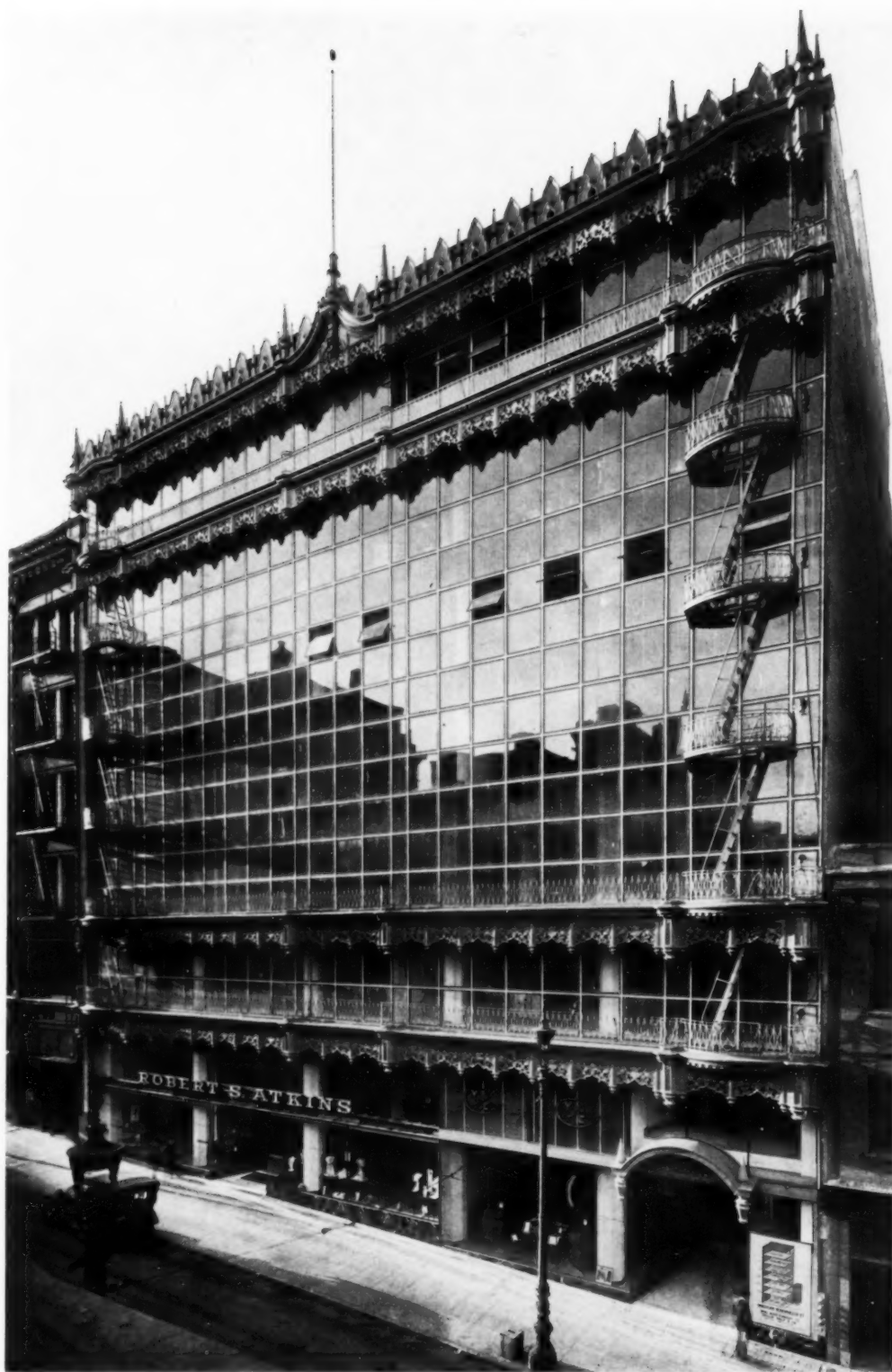


Window divisions of the historic periods were determined by manufactured sizes. They never had esthetic purpose. The windows of the older English cottages and colonial dwellings are attractive, not because of the small glass divisions but because of a general harmony which resulted from a logical and non-imitative design.

The large sheets of glass produced by present day methods should be used for window display, offices, schools and residences, both for economy and good lighting. Framework and muntin bars should be of minimum width.



Maximum of glazed area with a minimized classical enframement. This could not be accepted as the best solution because decorative details applied to the surface of the building add to cost without increase in convenience. Building for Doll and Sons, New York City, 1920. Alfred Bossom, architect.



Moulin

Completely glazed wall which determines the character of the building and its use for display and sale of wearing apparel. The Gothic trimmings do not contribute to such a purpose. It is however a more satisfactory solution for interior daylighting than later examples with heavy wall construction and widely spaced windows. Hallidie Building, San Francisco, (1918). Willis Polk and Company, architects.

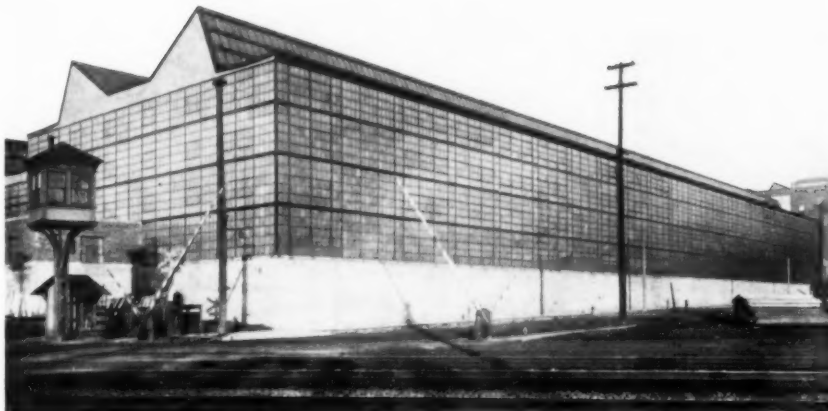


Gateway

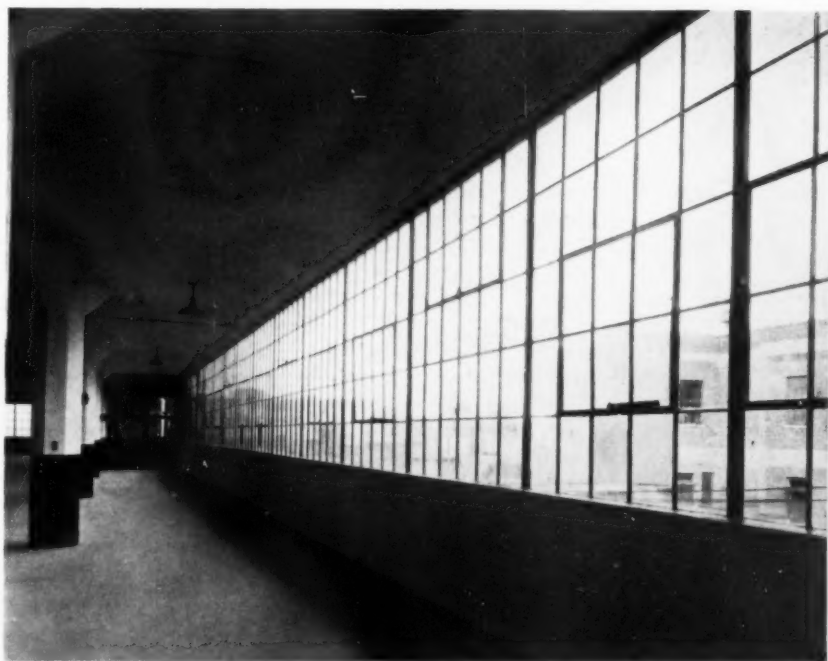
The gridiron window pattern was evolved from Renaissance architecture which had a spaced fenestration because of limited light requirements. This arrangement, while attractive, suggests supporting wall construction (walls are actually supported by the steel framework). 120 Wall Street, New York City. Ely Jacques Kahn, architect.

Interior of an office which illustrates darkened walls and limited light with the spaced window scheme. Note decrease in daylighting with distance from exterior windows. See pages 135, 136 for analysis of effective lighting.





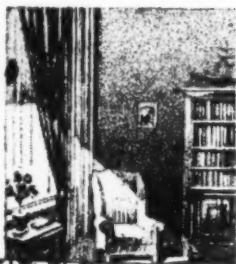
The factory, generally speaking, has been free from architectural or stylistic restrictions. In order to obtain well lighted working space, exterior walls have become literally "walls of glass." There are more favorable light conditions in many factories than in office buildings and apartment houses.



Manning Bros.

A maximum of daylight is obtained with the continuous window. This is made possible with cantilever floor construction. Graham Paige Service Building, Detroit, Mich.

THE SUN SHINES ALL DAY AT 133 East 80th Street



Some of the apartments in this new building face southeast, others south and southwest over low private houses. . . This means sunlight all day long in their large, well-proportioned rooms. Ample closets.



FLOODED WITH
SUNSHINE
215 East 70th

100%*

From current real estate section of N. Y. Herald Tribune

LIGHTER ROOMS! LIGHTER RENTS!

Rooms that are lighter to live in . . . commanding an unobstructed view of the Hudson and beyond . . . and rents that are probably lighter than what you are now paying, and certainly lighter than formerly at 280 to 290 . . . in spite of the fact that they were always reasonable.

285 290
Twenty Stories of Sunshine



at 205 East 70th Street

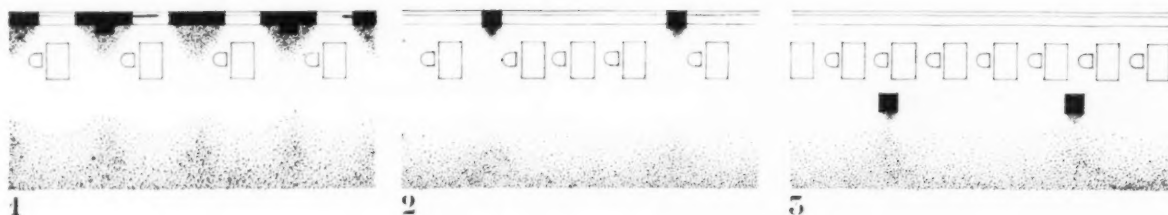
The Room,
th.

Sunshine featured in renting apartments. The public wants light and sunshine, otherwise realtors would not stress it. Tenants pay more for apartments or offices that have much light. Rooms with small windows and light that is unfavorable for work rent with difficulty. Architects should be guided by such demands.

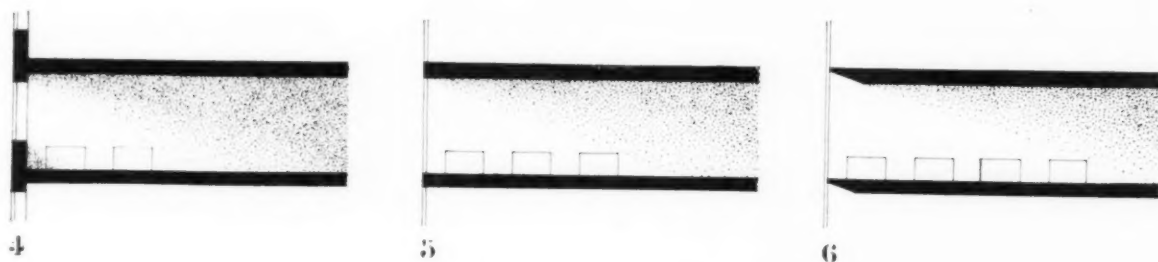
"The more daylight you have inside a building, the better, if it is evenly distributed. No maximum limit for good seeing has yet been found."

"For the reason just given, it is perfectly safe to design for as much light as possible. Be sure you get enough light. Don't worry about getting too much."*

* Industrial Daylighting, p. 6.



Plans with actual and suggested methods for daylighting office space. (1) Typical arrangement with moderate size windows. (2) Exterior wall reduced to supporting columns with increase of adequately lighted area. (3) Maximum lighted area with columns set back from outer wall with cantilever floor construction.



Sections showing depth to which adequate daylight is transmitted. (4) Windows of limited height (typical). (5) Glazed area from floor to ceiling. (6) Depth of well lighted working space increased by tapering ends of cantilever floor construction.

Effective lighting for clerical work in an office requires ten foot candles of light intensity at desk height. "Ten foot candles is more light than formerly was considered necessary but experience shows that seeing improves with increase in illumination. Speed of vision and accuracy of sight increase. Ocular fatigue decreases."^{*}

"The daylighting on a horizontal plane outdoors, at noon, on a clear day in June sometimes is as much as 10,000 f. c. but it does not harm the normal eye because the eye adjusts itself to such intensities. . . . No such intensities can be secured inside a building."[†]

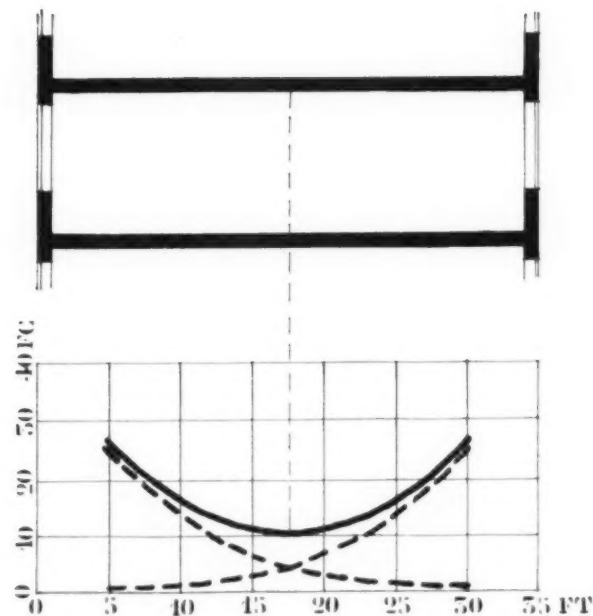
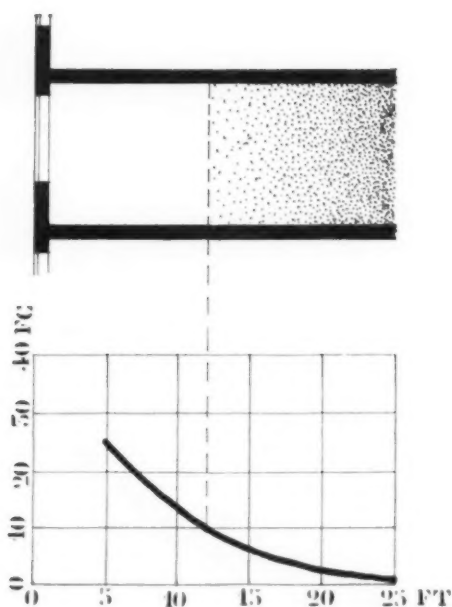
The office, schoolrooms or apartment would be efficiently lighted if the window area is at least 30% of the floor area.

Contrasts of light and dark areas in any building should be so adjusted that the brightest light should not exceed three times the illumination of the dimmest area in the same room.

The most favorable place for reading or work is on a covered porch completely open on three sides.

^{*} Industrial Daylighting, p. 5.

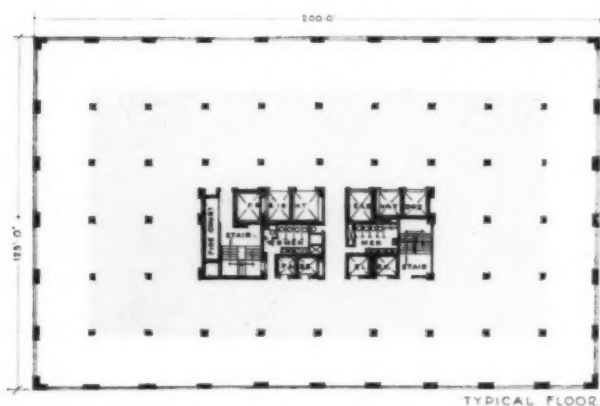
[†] Ibid p. 6.



SECTIONS WITH DIAGRAMS SHOWING HOW MUCH LIGHT IS ADMITTED BY WINDOWS.

A vertical window admits satisfactory daylight into room interiors approximately twice the window height.

A room that is lighted from two opposite sides has adequate daylight that extends from each side a distance of three times the window height.



Typical floor plan of loft building showing adequate daylight area and shaded part that requires artificial illumination during most working hours.

HOW MUCH DAYLIGHT IS REQUIRED?

	Mini- mum f. c. 15 years ago	Mini- mum f. c. 8 years ago	Mini- mum f. c. today
(1) Aisles, elevators, storage.....	0.5 to 1	3 to 6	5 plus
(2) Churches, Auditoriums.....	1 to 3	2 to 4	3 to 8
(3) Department stores...	3 to 7	7 to 10	10 plus
(4) Show windows....	5 to 40	10 to 70	15 up
(5) Rough manufacturing.	2 to 4	3 to 6	6 plus
(6) Clerical work.....	3 to 8	5 to 12	10 plus
(7) Fine manufacturing..	4 to 8	6 to 12	10 plus
(8) General drafting room work.....	5 to 10	10 to 15	15 plus

From Industrial Daylighting, p. 5.

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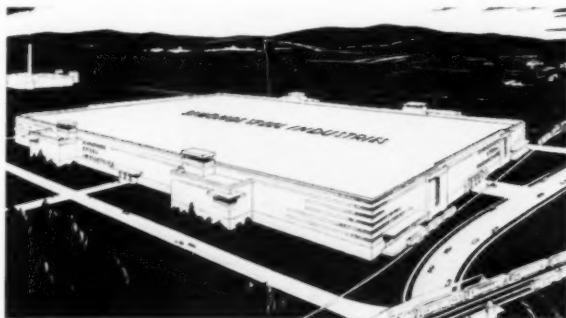
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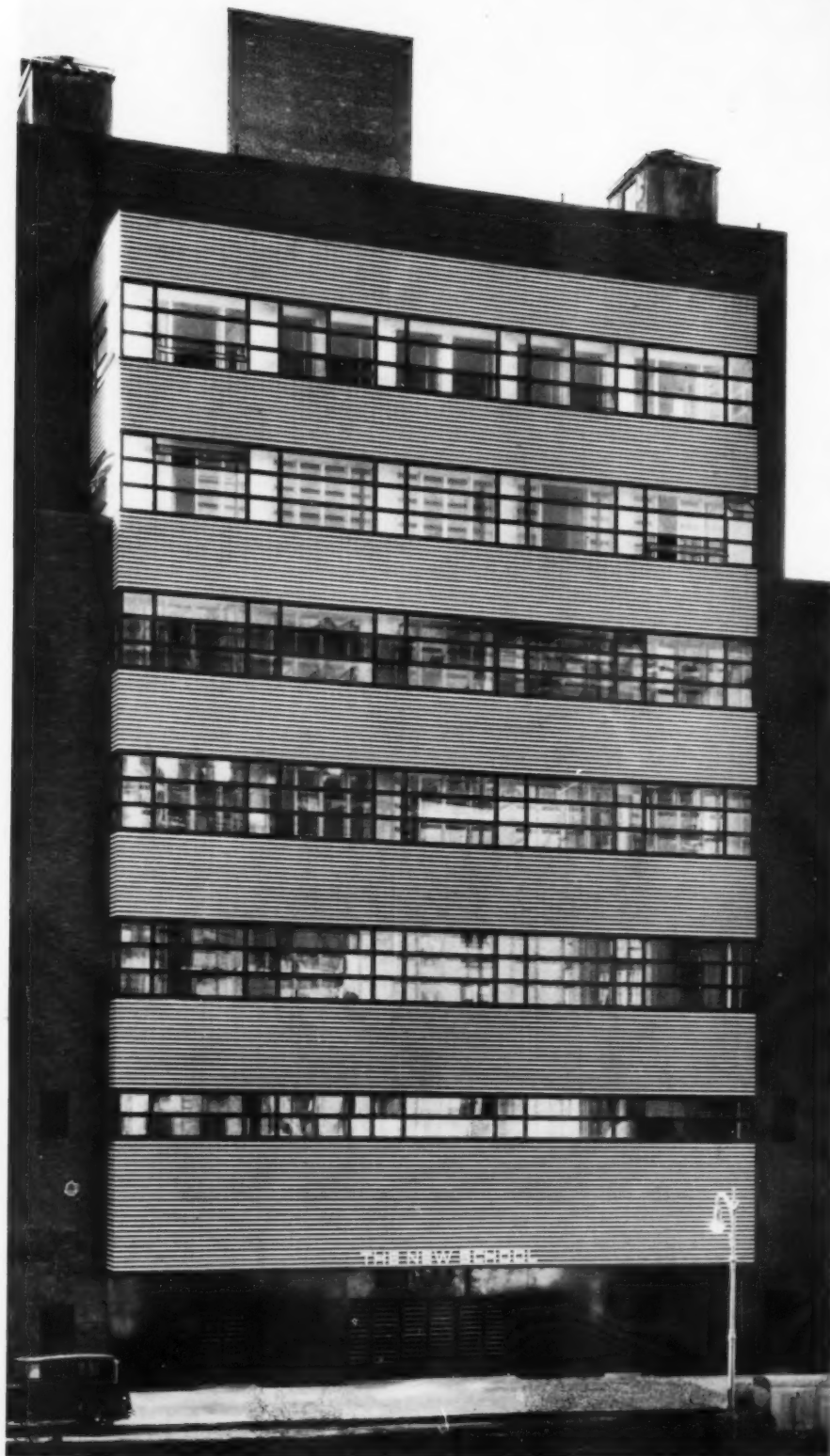
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Windowless Building now under construction for the Simonds Saw and Steel Company, Fitchburg, Mass. The Austin Company, Engineers and Builders. An attempt to attain lighting by artificial methods with intensities that do not vary. Mechanical ventilation is provided. It remains to be proved that the artificial atmosphere and lighting are equal in all respects to natural methods.

THE NEW SCHOOL FOR
SOCIAL RESEARCH
NEW YORK CITY
JOSEPH URBAN, ARCHITECT



Nyholm and Lincoln

Elevation. Solid masses, mat black brick. Window spandrels, mat black and pale buff brick. Veneering round doors, Coopersberg black granite. Window frames, rolled steel painted black. Interior window frames and column surfaces generally carry the color of the rooms: sixth floor, white; fifth, yellow; fourth, dark blue; third, orange; at right, gray and blue; second, maroon; at right, gray-blue and deep blue; mezzanine, light orange.

THE NEW SCHOOL FOR SOCIAL RESEARCH

JOSEPH URBAN, ARCHITECT

J. H. TAYLOR, CONTRACTOR

By Shepard Vogelgesang

Plot dimensions: 103' 3" x 77' 7 1/4".
Height of building: 7 floors and basement.
Total cubage: 803,000 cu. ft.
Complete cubage costs including fixtures, decorations and furnishings, exclusive of two mural paintings: 65c per cu. ft.
Total cost, exclusive of land price: \$500,000.

The New School was founded on the perception of the demand for adult mental occupation and expansion in an age which, among the machine products, has been rapidly fabricating leisure. The client, Dr. Alvin Johnson, is an educator of broad information and liberal ideas. His experiment was to give opportunity for following many interests in this leisure time. It met with a degree of success which demanded more ample housing. What he wanted of his architect was the embodiment of the school requirements—simply, technically and beautifully, within the economic means at hand. There was no question of recalling the past; the building was to function in the present and if possible to forecast the future. To these liberal assets he added the skill and enthusiasm of two outstanding progressive American painters, Thomas Hart Benton and Jose Clemente Orozco. Benton is a New Yorker whose work was well known for vigorous ability but never before adequately incorporated in a building. Orozco is a Mexican with the forcefulness and integrity which New York recognizes in the famous Mexican group but has been reluctant to provide with patronage. During the erection of the building the enthusiasm of the architect, the client and these painters communicated to everyone engaged in the work. Few buildings have opened with an equal air of suspense. Few buildings have ever had so much experiment and intense conviction at stake.

The organization in plan is concentration of the instruction facilities in the basement, ground floor and second floor; third floor—administration; fourth, fifth and seventh—research, exhibition and studio. The vertical circulations, elevators and stairs disperse upward traffic in two channels in parallel stacks on each side near the front of the building. The toilets and kitchens are also in tiers, opening on two sides on light shafts located toward the rear of the building.

For instruction in the dance a circular room with ballet rail is provided in the basement where Dalcroze eurythmics, ballet and round dances can be given. The first floor comprises the main auditorium seating 550 persons, and entrance lobby from each end of which all other floors are accessible by two elevators and stair towers. Above is a mezzanine with two galleries each accommodating 20 additional spectators, a projection room equipped for sound motion pictures and a bookstore. The second floor provides five class rooms, two accommodating 220 and 187 students each on ramped floors which parallel the curve of the auditorium ceiling. Classes are held for the most part in the evening so usual requirements of orientation to natural light were waived in favor of utmost economy in space.

On the administration floor the dome of the auditorium is echoed by the rise in level to the board of directors' room. This room is flanked by general office space and building superintendent's quarters. The central area on this floor is occupied by the reception room where the general public is accommodated. On one side of this room, across the front of the building, are the director's and assistant director's offices, each with a secretary's room, flanking a central office for the school clerk. On the opposite side of the room, across the back of the building, is the board of directors' room.

The fourth floor accommodates the library which connects through an open well by a double flight of stairs to a landing on the exhibition floor. The rear of the library is raised above the board of directors' room a few steps to the area allotted to book stacks and office space.

The fifth and exhibition floor is all on one level. Across the front and for two-thirds of the depth of the building is exhibition space. The remaining third is occupied by the students' dining room with a dining room for the faculty to the right and kitchen to the left.

The donor of the property has an apartment occupying the sixth floor which will eventually revert to the use of the school.

On the seventh floor is a wide, open room with a terrace to the front of the building. It is to be used as studio space.

Apart from affording the changes of floor level on the second, third and fourth floors, the auditorium,



Nyholm and Lincoln

THE NEW SCHOOL FOR SOCIAL RESEARCH
NEW YORK CITY
JOSEPH URBAN, ARCHITECT

Detail of brickwork and windows. Black brick laid in mineral - pigmented black cement, buff brick jointed with buff cement.

with class rooms above, conditioned much of the plan. Its shape influenced the contour of the dance floor in the basement below it and the entrance lobby in front of it. Steel columns rest on the extremities of the girders which roof the auditorium. Throughout the building the void which it establishes in the centre of the structure is felt by the absence of columns and the openness of central space on each successive floor.

The side passages extending from back to front of the building provide fire exits from the rear classrooms above the auditorium as well as direct communication with the stage. Above the mezzanine these passages are covered by stairs and other extensions of the building.

The auditorium occupies maximum space commanding good view of the stage. The domical cover, evolved as the logical enclosure to such a plan, provided location for the lighting scheme and also, originally, for the ventilating system. Adoption of a hung plaster ceiling 25 per cent perforated for acoustical reasons changed the ventilation scheme by permitting the use of the entire ceiling surface as a vent into the plenum chamber above. The auditorium functions acoustically like an open air theatre. The wood background of the stage and the folding wood curtains act as resonant reflectors for sound which is projected into the seating space and immediately absorbed through the ceiling perforations in the same way it would be dissipated in the air above an out-of-door stage. Right and left of the main stage are two side stages for choruses and music incidental to theatrical performances.

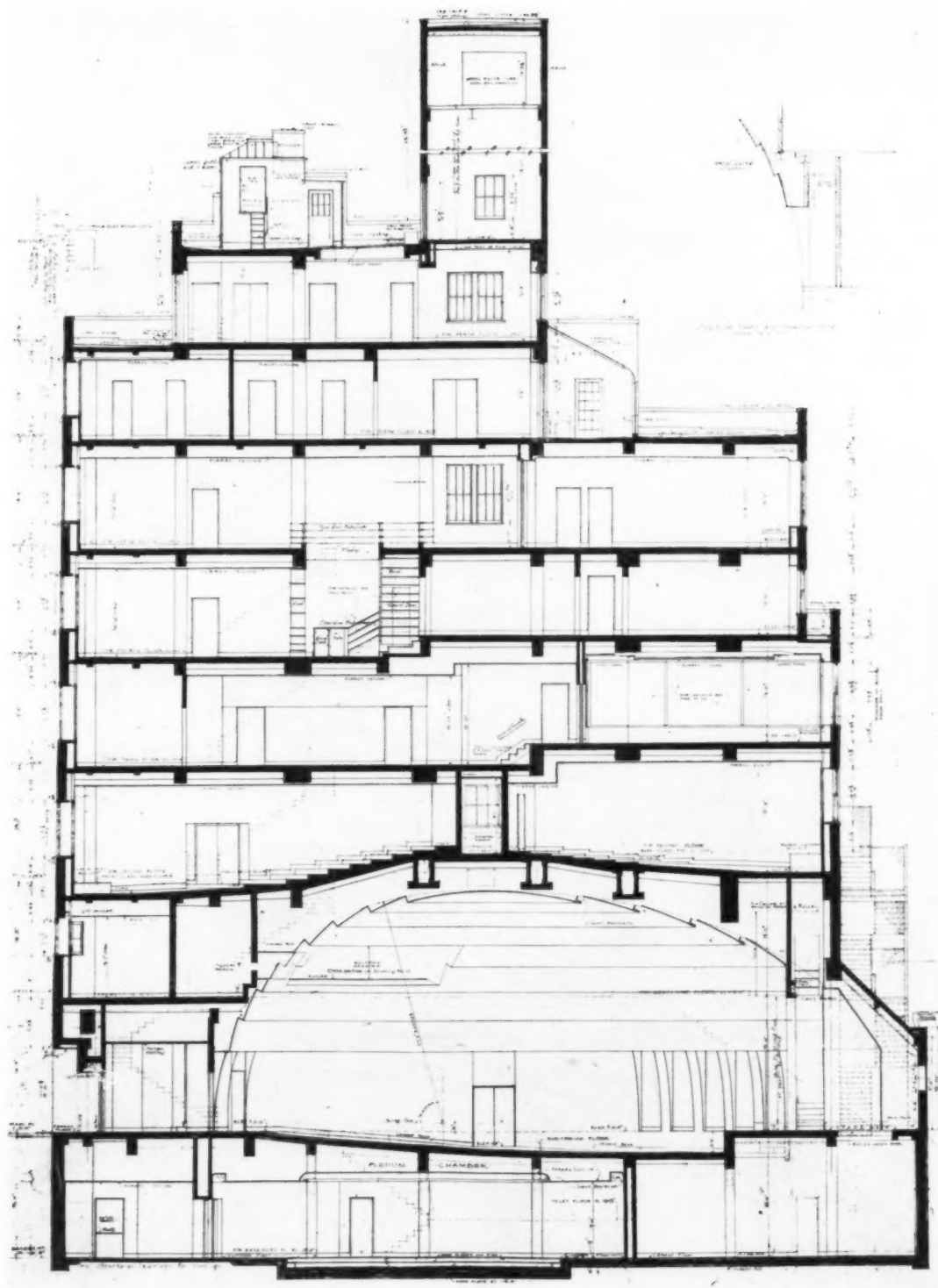
Professor Floyd R. Watson consulted on the acoustic problems of the room. The result in his estimation establishes a distinct advance in the science of acoustics which can lead to almost limitless possibilities in the variation of auditorium forms. In addition to the acoustic properties of the auditorium there is an interesting installation of electrical sound equipment to be connected by radio with the outside or used to transmit interior programs. A series of loud speakers makes possible giving music or speech simultaneously in the dance room, the auditorium and one of the upstairs classrooms. The main auditorium has also equipment at the speaker's desk which permits the amplification of a weak voice. The apparatus is controlled from one of the seats in the rear of the auditorium and possesses the remarkable quality of filling the room with uniform sound in such a way that no variation of intensity is noticeable between seats placed directly under the desk amplifier and seats in the rear of the room. In the center of the rear stage wall is a loud speaker horn 7 feet square which can be concealed by doors uniform with the stage walls. It is proportioned to the volume of the room and the stage. The shape of the stage further enlarges the trumpet action of the installation. Back of the rear

stage wall is a sound chamber. In the peak of the stage chamber is a grille communicating back to the sound chamber. This connection acts precisely like the eustachian tube of the ear, equalizing air pressures on the diaphragm caused by varying volumes of sound. This device is essential when the sound box is separated from the room into which sound is projected. The large horn is also for use with sound motion pictures. A sound screen has been installed which can be lowered in front of the horn.

Beside the lighting apparatus and a floor trap there is no stage equipment, no gridiron and only such fly galleries as are needed to accommodate the motion picture screen with a velvet mat. Whatever scenery is to be used will be indicative of the mood, time and place of action, not pictorial. Two four-speed door sections opening in the middle supplant a curtain. The room functions acoustically without any curtaining usual to a theater. The only hangings are those in the side stage openings and at the back of the galleries. These are found unnecessary for sound purposes.

Since the building is to accommodate 2,000 students, additional sheltered sidewalk space in front of the entrances was a necessity. For this reason the entrance wall was set 3 feet back from the building line and the other stories were cantilevered out to the building line. As the site is on a narrow side street, windows were made continuous to admit as much light as possible. The building presents to the street a bay facade in horizontal bands of glass and continuous black and white brick spandrels enframed in the plain vertical black brick elevator and stair tower walls without windows. The mat black brick is laid up with $\frac{1}{2}$ " mortar joints containing black mineral to provide a color as near black as practicable. The entrance is veneered with large slabs of black Coopersberg granite anchored to a common brick back wall; copings are mat-glazed black terra cotta. The soffit of the overhang is sheathed in bronze plates. Owing to the proximity of the elevator shafts it was impossible to eliminate the corner columns in the bay by cantilevering without excessive extravagance. The black and white brick facade batters one foot in its total height. This is accomplished by setting the sills a few inches back at each floor. The purpose of this device is to prevent the optical impression of the building leaning over the street, to rectify the tendency toward concavity in a line composed by joining vertical and horizontal members such as the window uprights and brick coursing. There is a slight addition to the quantity of light admitted to the interior by sky reflection which the backward cant emphasizes.

The exterior windows are specially made steel sash, the top and bottom units of each bay of the projected type, the other units fixed. The steel sash is set on the exterior face of the building. On the



THE NEW SCHOOL FOR SOCIAL RESEARCH
NEW YORK CITY
JOSEPH URBAN, ARCHITECT

Contour of the auditorium dome provides, in the main classrooms above it, change of level which at the rear of the building continues through the third and fourth floors.

interior a second vertically divided casement sash is set flush with the inner face of the sill. The double windows allow a reduction of 25 per cent in heating costs for these window areas; they provide effective insulation against street noises. The width of the sill between windows permits the window cleaner to pass between the sash and reach all glass surfaces. The vertical articulation of the inside casements is also necessitated by the window cleaning problem. In the students' dining room the projected type of sash provides 100 per cent ventilated area and allows the decoration of an area of center wall which with double hung or other partially ventilating types of windows would have been lost.

Direct radiation from heaters located generally under the windows supplies the heating of all rooms, except the entrance lobby where a hot blast recirculating system is used. The boiler is oil burning, operating at 0-15 pounds pressure. Condensate is returned to the boilers by vacuum pump. Separate supply and exhaust ventilating systems provide ventilation to the basement dance floor, the auditorium and two main classrooms. Unit ventilators of the recirculating type with fresh air inlets from out of doors supply the other rooms. The basement toilets are in separate exhaust systems while gravity exhaust ventilates the kitchen range hood and interior toilets.

Only the basement plumbing fixtures are on an ejector, the remainder of the sanitary system is gravity flow from the roof tank.

Lighting is designed mainly for a pleasant distribution of illumination where required. Most of the fixtures are of built-in design. Where cost prevented installation of ceiling boxes simple triangular fixtures, bulb and socket fixtures, hanging reflectors and circular metal domes with flat diffusing glass plates were designed. Each of the two mural artists has a different scheme of illumination. That in the board room decorated by Mr. Benton throws all the light on the murals, leaving the center portion of the room to be illuminated only by light reflected from the walls. In the students' dining room Mr. Orozco's desire was for general illumination which gave equal importance to all objects in the room without emphasis on the murals. He wished by this method not to exhibit the paintings as decorations but to keep them as much as possible a part of the life of the room. The lighting of the auditorium is designed to place dramatic emphasis on the stage. Four rings of the dome carry lights in reflectors, the upper ring 20 100-watt lamps, below it 32 100-watt lamps, and 40 60- and 48 50-watt

lamps each. The stage equipment consists of three panels of four colored lights, red, blue, amber and white, each color having a capacity of 8000 watts. Four spots located in stage wings, two arcs in projection booth. One panel is over the proscenium, the others are in the side stages; all are hung on pipe battens. The entire auditorium lighting equipment is controlled from a room at the extremity of the left side stage by Vitrohm continuous duty dimmer plates of interlocking type. There is a master lever for the auditorium ceiling lights and a master control of 110 steps for each section including the balcony lights. The electrical energy supplying lighting to the building is 4 wire 120/128 volts. The entrance lobby and dance floor are completely cove-lighted; in both rooms the lighting follows the ceiling contour with the addition in the basement of a rectangular cove over the dance floor. These examples of strip and cove lighting taken with the illuminating system of the auditorium contribute the newest uses of architectural lighting to be seen in the building.

Light and power are operated generally separate and are connected with a main distribution board.

Color has been extensively used in the building. Behind the glass of the facade is visible part of the color scheme. It shows in blocks of red, blue, green, yellow, orange, white, purple, brown, dark blue, as it occurs in the rooms behind the glass. The gamut of color is for the most part strong; a few pale yellows are used, no reds darker than an English vermilion but a variety of greens, blues and browns, all the way to black. The total is ninety colors including white. The use of color has had various purposes in different rooms, governed generally by principles of lighting; cool colors in shadow; warm colors in light; large areas of color of high reflecting power against smaller areas of colors with high absorption to even out the illumination of the rooms. Beyond these principles of application are other considerations, balance of accent, focusing attention at a desired point in the room, maintenance of a diagrammatic scheme to add to the legibility of planning where needed, and selection of colors for their emotionally reactive values. By confining color to the actual planes of the building accenting structural features—columns, for example, are generally kept white—architectural values are enhanced and color given its proper function in building. The ceilings and walls, where not exposed to wear, are executed in a new casein matt paint; the remainder of the work is oil stippled flat except where staining is used on cork or woodwork.



Nyholm and Lincoln

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NEW YORK CITY
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Staircase between library floor and exhibition and dining floor. Library ceiling, deep blue; plane under right and left balconies, gray; wall back of stairs, light chrome yellow; exhibition floor walls, gray; ceiling and columns, white. Maple trim, black, showing wood grain slightly.



Nyholm and Lincoln

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NEW YORK CITY
JOSEPH URBAN, ARCHITECT

Entrance lobby. Ceiling lighting surface, white Sunflex paint; ceiling surface and over doors, black Sunflex; end walls, burnt sienna oil paint; vent and pipe chase surfaces, white oil paint; metal work, gun metal finish oxidized bronze; floor, black and white terrazzo laid in bronze strips.

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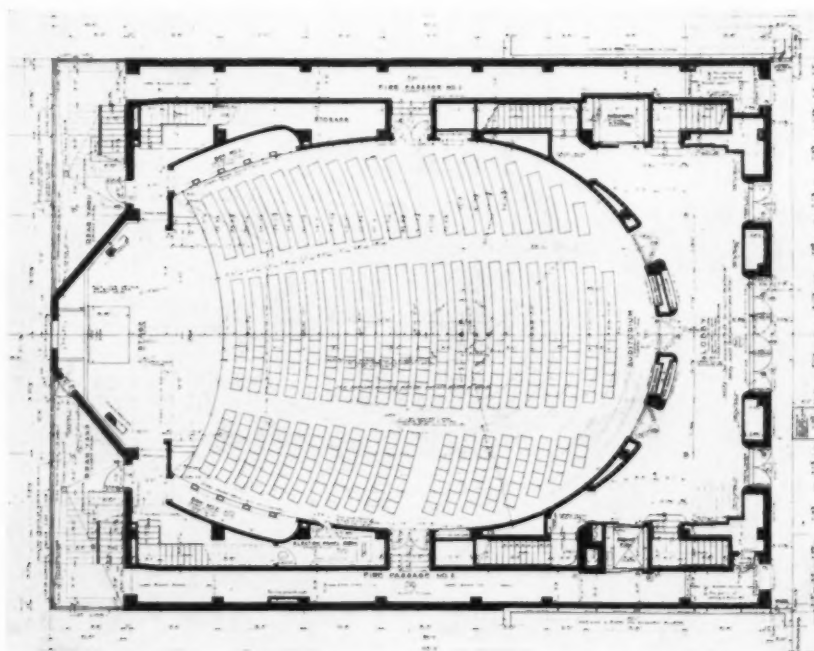
THE ARCHITECTURAL RECORD
FEBRUARY, 1931



Nyholm and Lincoln

Auditorium. Hung plaster ceiling 25 per cent perforated to produce acoustic conditions similar to those of an open-air theater. Main stage opening closed by two 4-speed doors; stage cyclorama and side stage walls built of maple with one thin coat of white paint to aid in reflecting colored lighting. Walls, gray Sunflex graded in nine tones to top of ceiling; proscenium and ceiling reveals of English vermilion; carpet to match; chair seats, dark gray; seat backs and stage doors, black.

FIRST FLOOR PLAN



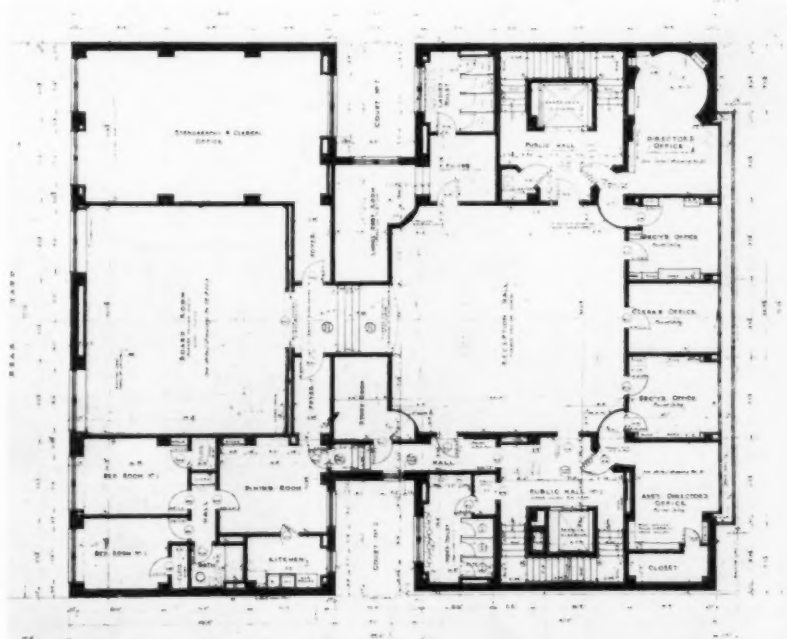
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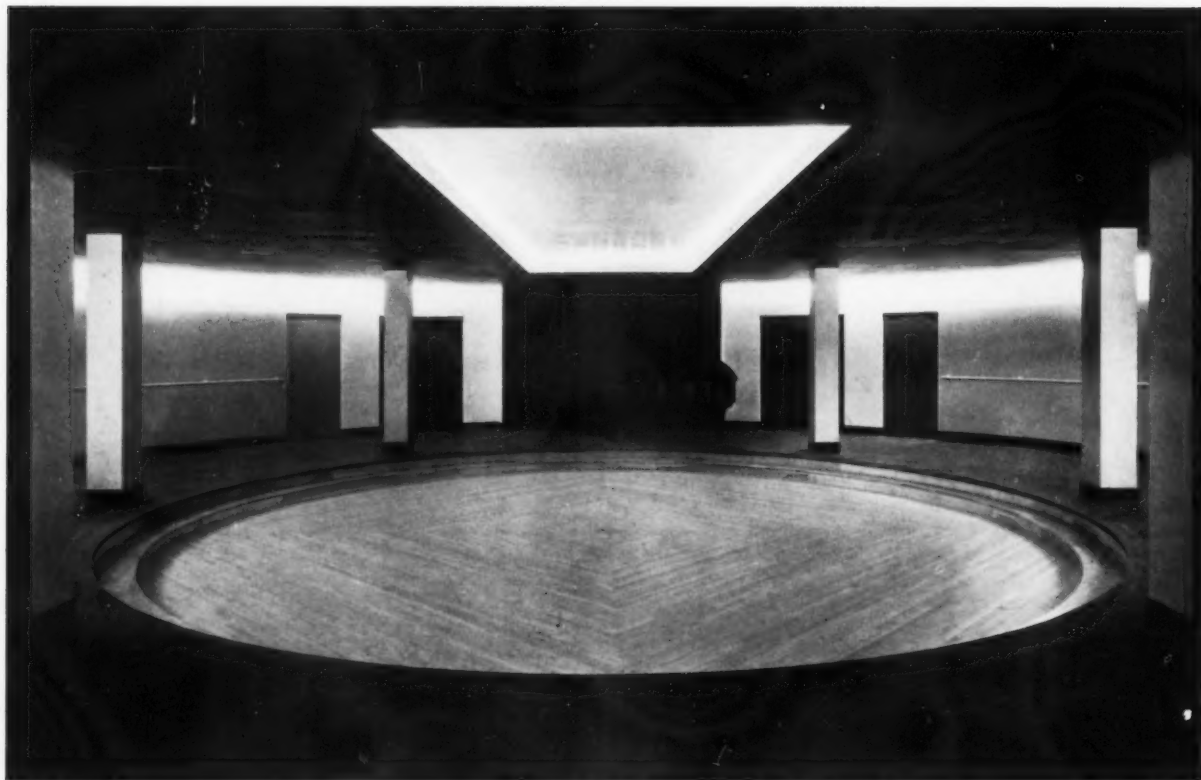
Nyheim and Lincoln

Board of directors' room. Murals by Thomas Benton. Ceiling, terra cotta Sunflex; lighting fixture, opal glass; moldings, aluminum leaf wainscot; doors and tables, black eggshell finish lacquer; floor, varnished maple; curtain material, cerulean blue.

THIRD FLOOR PLAN



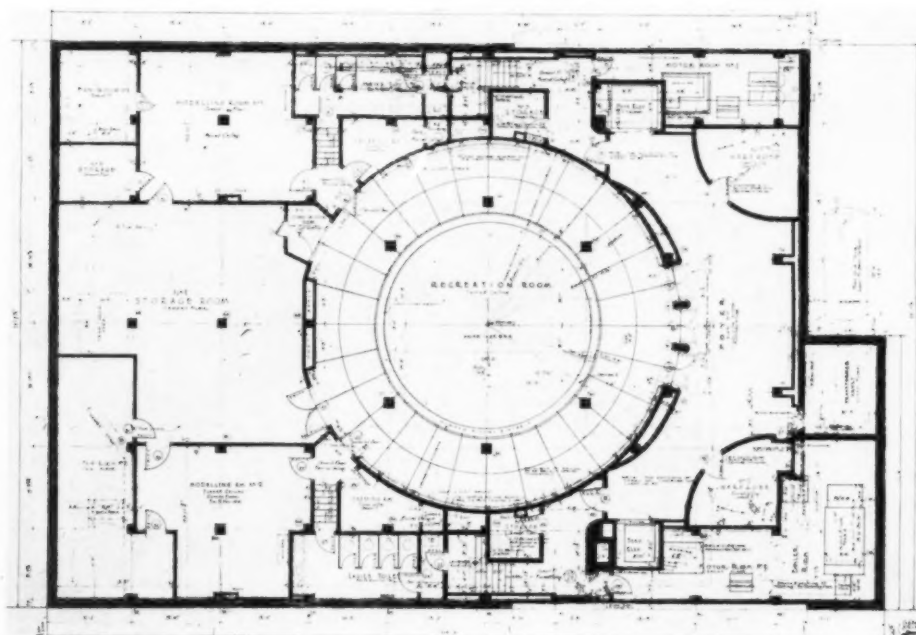
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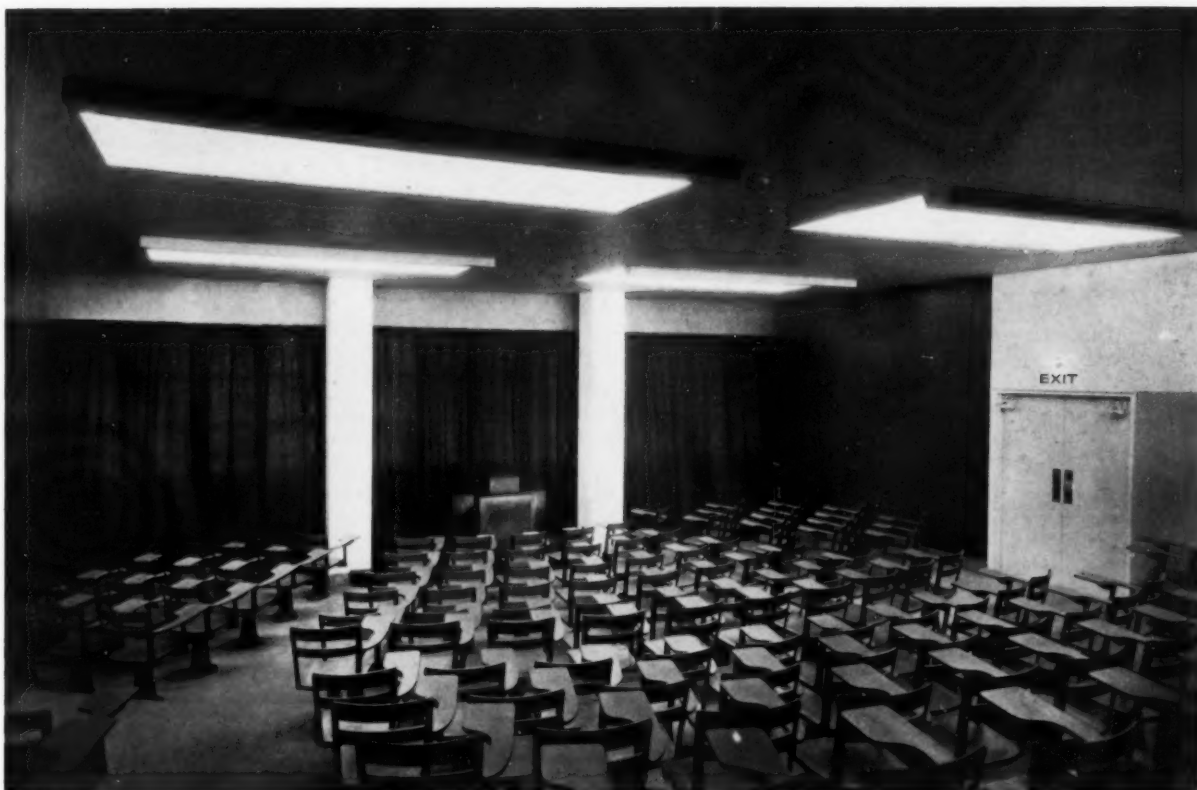
Nyholm and Lincoln

Dance floor. Dancing surface, varnished and waxed maple; surrounding floor, dark blue Marbleoid; ballet rail, aluminum; ceiling, black and white Sunflex. Walls, deep blue, citron, English vermillion, emerald green, orange, ochre, cobalt blue, delft blue; rectangles in flat oil paint; columns, brushed aluminum paint.

BASEMENT FLOOR PLAN

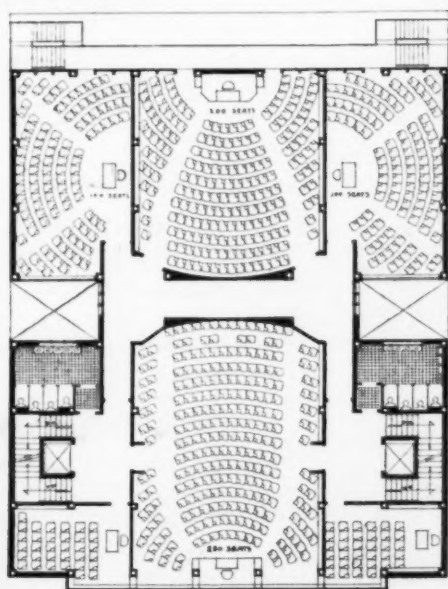
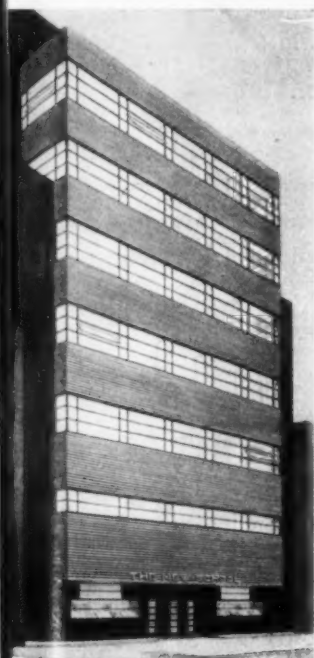


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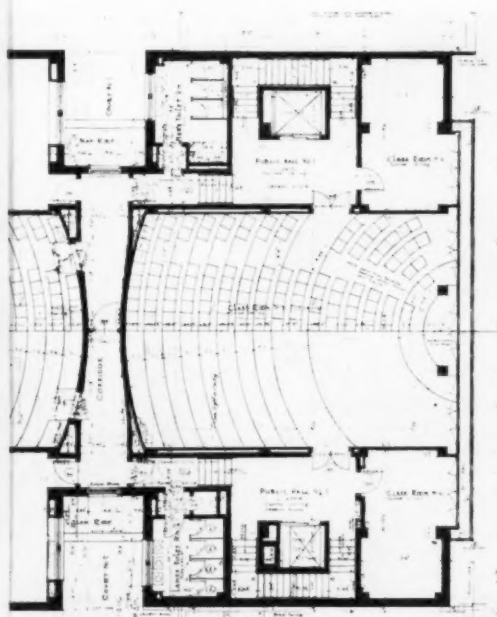


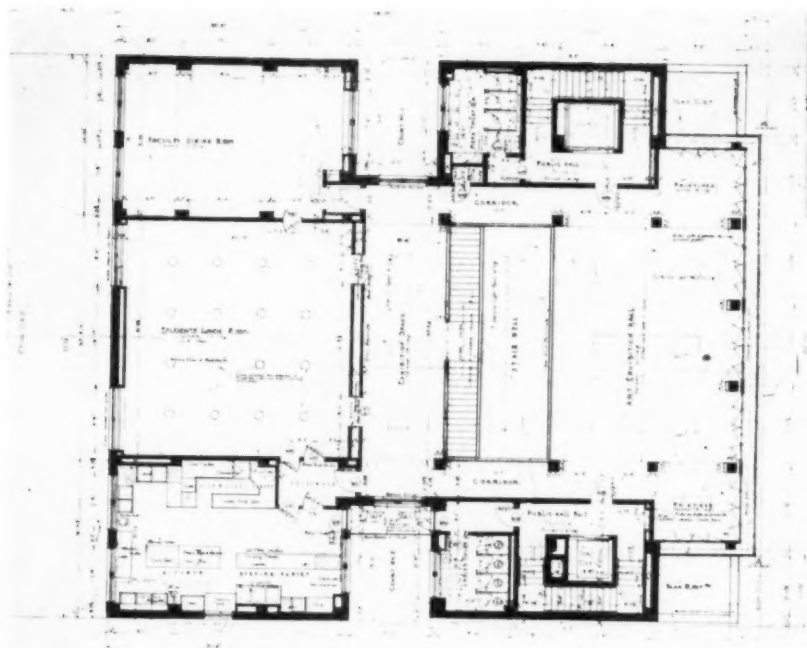
Nyholm and Lincoln

Main front classroom. Pale yellow ceiling; window wall, gray-blue; curtains, indigo blue; columns, white; side walls, deep green-blue; doors, pale chrome yellow; strip over door to back of room, white; strip below, deep orange; rear wall, gray-blue.

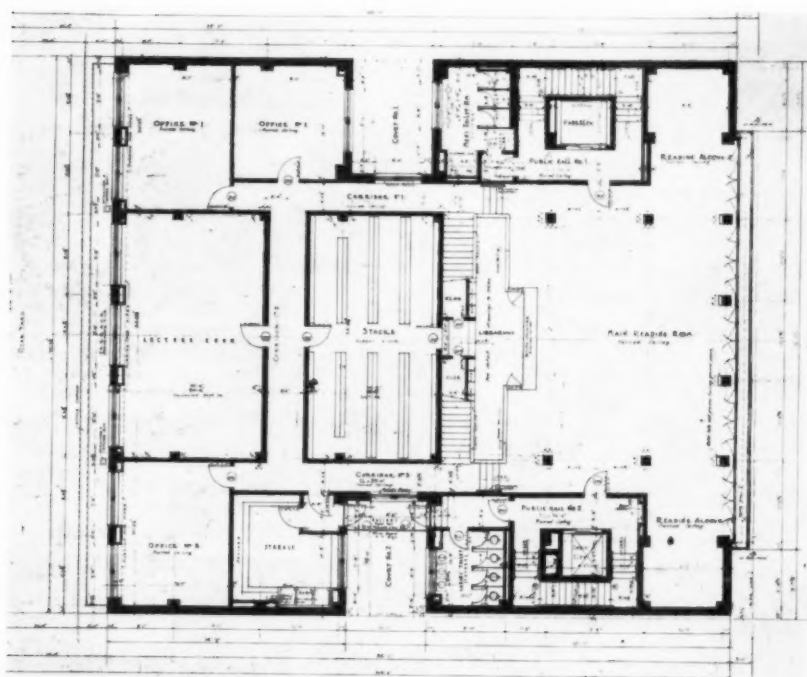


Soziale Schule in New York City. Arch. J. Urban.
Ein Obergeschoß mit 6 Vortragssälen.





Fifth floor plan: front, exhibition space; rear, students' lunchroom, faculty dining room, kitchen; center, stair well down to library.



Fourth floor plan: front, library reading room; rear, temporary office space for later stack room extension; center, stack rooms and stair well to fifth floor.

THE NEW SCHOOL FOR SOCIAL RESEARCH
NEW YORK CITY
JOSEPH URBAN, ARCHITECT

TECHNICAL NEWS AND RESEARCH

STADIUM PLANNING

By MYRON W. SERBY, Stadium Consultant



Stone from Gateway

MEMORIAL STADIUM, UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA
JOHN GALEN HOWARD, ARCHITECT
E. E. CARPENTER, CONSULTING ENGINEER



© Aerial Photographic Service

TEMPLE UNIVERSITY STADIUM
PHILADELPHIA
CLARENCE E. WUNDER, ARCHITECT AND ENGINEER

Suburban location permits additional playing fields and ample parking space for automobiles.



STADIUM PLANNING AND DESIGN

By MYRON W. SERBY

The average stadium has a seating capacity of 5,000 to 20,000. There are about forty large stadiums seating from 20,000 to 125,000 in the United States. Of these, twenty-two are owned by educational institutions, twelve by professional baseball clubs and six by municipalities. The first of the large stadiums was built at Harvard, followed by stadiums at many other educational institutions. Organized baseball then found it necessary to provide for the increasing multitudes of interested baseball fans. These stadiums came into being through virtual necessity and their immense earning capacities were assured at the outset.

Municipalities are slowly awakening to the public need for adequate stadiums. Where conditions are favorable, stadiums are "gilt-edge" business propositions yielding a high return and will continue to draw their enthusiastic multitudes long after they have paid for themselves. The recent development of night illumination brings the stadium into our national life as a means of recreation for the general public, equal in importance to radio, motoring, moving and talking pictures.

There are about 1,300 cities with populations of 5,000 to 25,000; 225 cities with 25,000 to 300,000; and 27 cities with populations over 300,000. It is evident that the six existing municipal stadiums should serve as a nucleus for a tremendous development in this field in the near future.

PLAY AREAS

All that space within the stadium allotted to the use of the players or performers for a given athletic game or contest is referred to as the play area. This area includes the space within the official boundaries together with sufficient clearance outside the lines for out-of-bound plays.

Football

Football, according to the rules of the National Collegiate Athletic Association, is played upon a rectangular field 360 feet in length and 160 feet in width. Goal lines are established in the field of play 30 feet from and parallel to the end lines. The goal posts are placed 18 feet 6 inches apart in the middle of each end line; they should exceed 20 feet in height, with a horizontal cross bar 10 feet from the ground.

A minimum clearance of 20 feet is allowed outside the official field of 360 by 160 feet. Thus the minimum football play area is 400 by 200 feet. All the

area beyond these dimensions is available for spectators.

Baseball

In practice football fields are laid out in close conformity to the official rules. This is not the case in baseball, in which playing fields used by professional clubs vary from the rules in many particulars. According to the Joint Playing Rules Committee of the National League and the American League, amended by the National Joint Rules Committee of Professional Baseball:

"The ball ground must be enclosed. To obviate the necessity for ground rules, the shortest distance from a fence or stand on fair territory to the home base should be 235 feet and from home base to the grand stand 90 feet."

Home base and first, second and third bases are at the corners of the 90-foot diamond. In the junior diamond for boys under 16 years of age the base distances are reduced to 82 feet.

A strict interpretation of the official rules would provide for the playing field a quadrant with a radius of 235 feet, but the long sides, referred to as left and right foul lines, must be greater than 235 feet in order to increase the difficulty of batting home runs. The home run due to short foul lines is now the subject of much agitation in organized baseball. The lively ball is also involved in this discussion. A study of the fifteen major league park measurements indicates that four have short left foul lines with longer right foul lines. Ten have short right foul lines. One has foul lines of equal length. The practice of providing one long foul line is explained by the fact that most ball parks are also used for football.

The following figures will show the range of foul lines in use:

Short foul lines

Maximum	365 feet	Boston Nationals
Minimum	258 feet	N. Y. Americans
Average	315 feet	(15 parks)

Long foul lines

Maximum	402 feet	Boston Nationals
Minimum	280 feet	N. Y. Americans
Average	353 feet	(15 parks)

In addition to the wide departure of foul line distances from the rules, the distance from home base to the grandstands is often as short as 60 feet instead of the 90 feet required. The reason, of course, is to

improve the view by bringing the playing field closer to spectators who are usually massed near the diamond.

One authority, in order to provide for greater uniformity in the layout of future baseball grounds, has suggested that the rules be amended as follows:

"To obviate the necessity for ground rules, the right foul line distance shall not be less than 300 feet nor more than 315 feet; the left foul line distance may be equal or greater than the above. The distance from home base to the grandstands shall not be less than 60 feet nor more than 90 feet."

The above suggestion conforms closely to actual conditions and should produce satisfactory baseball play in professional or amateur games. The 60 feet clearance behind home base may follow the arc of a circle with center at home base, thence following a tangent to this circle to an offset of 20 feet at the ends of foul line distances. This gives a play at the ends of foul line similar to that at the Yankee Stadium with a minimum length of 410 feet and width of 426 feet.

It is apparent from the above dimensions that whereas football play areas can be contained within baseball play areas, the reverse is not the case.

Track and Field Athletics

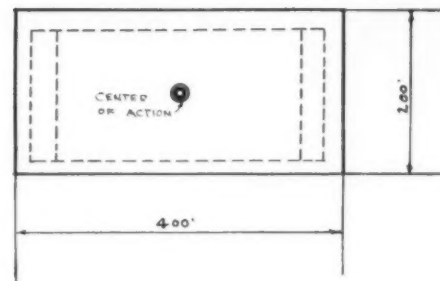
This phase of athletic competition is governed by the rules of the following:

Intercollegiate Amateur Athletic Association.
Amateur Athletic Union of the United States.
American Olympic Committee.
National Collegiate Athletic Association.
National Committee on Women's Athletics of American Physical Education Association.

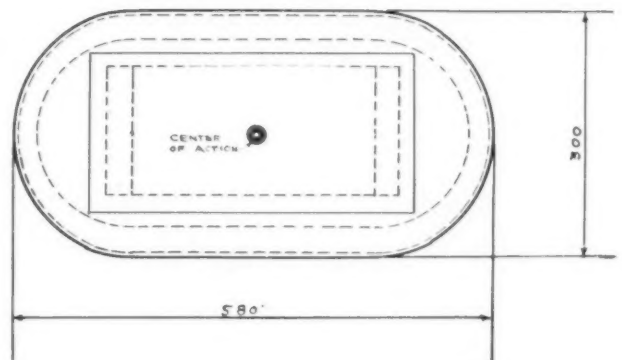
Track and field athletics originate from early Greek times, when stadiums were built to accommodate the crowds attending the sacred ceremonies of the Olympic games. In modern times these competitions are of international as well as national importance. While not so remunerative as football and baseball, no stadium is complete without a running track for track athletics.

Running tracks are built in connection with football and baseball stadiums. Accompanying diagrams give data for laying out tracks around football fields. With an inside clearance of 12 inches, the inner perimeter of the track layout is one-quarter of a mile, extensions of one or both sides being made for 220-yard straightaways. The oval with 225-foot tangents and relatively long radius is similar to that at Franklin Field stadium in Philadelphia. This is one of the best and fastest tracks in the country, the scene of many records. The oval with 350-foot tangents approximates the dimensions of the Ohio State stadium. Between these two extremes considerable latitude exists as to choice of dimensions. In general, ovals with short tangents and long curves are more satisfactory.

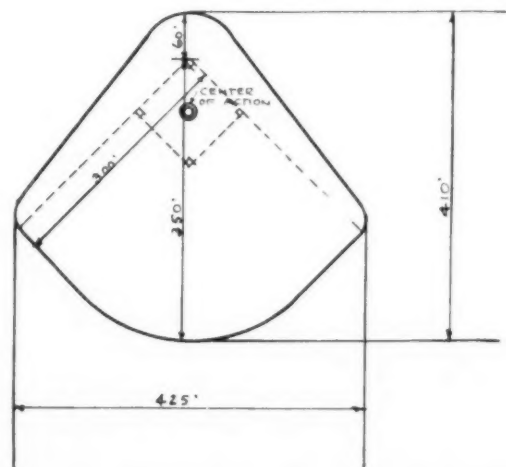
In layout of tracks associated with baseball fields



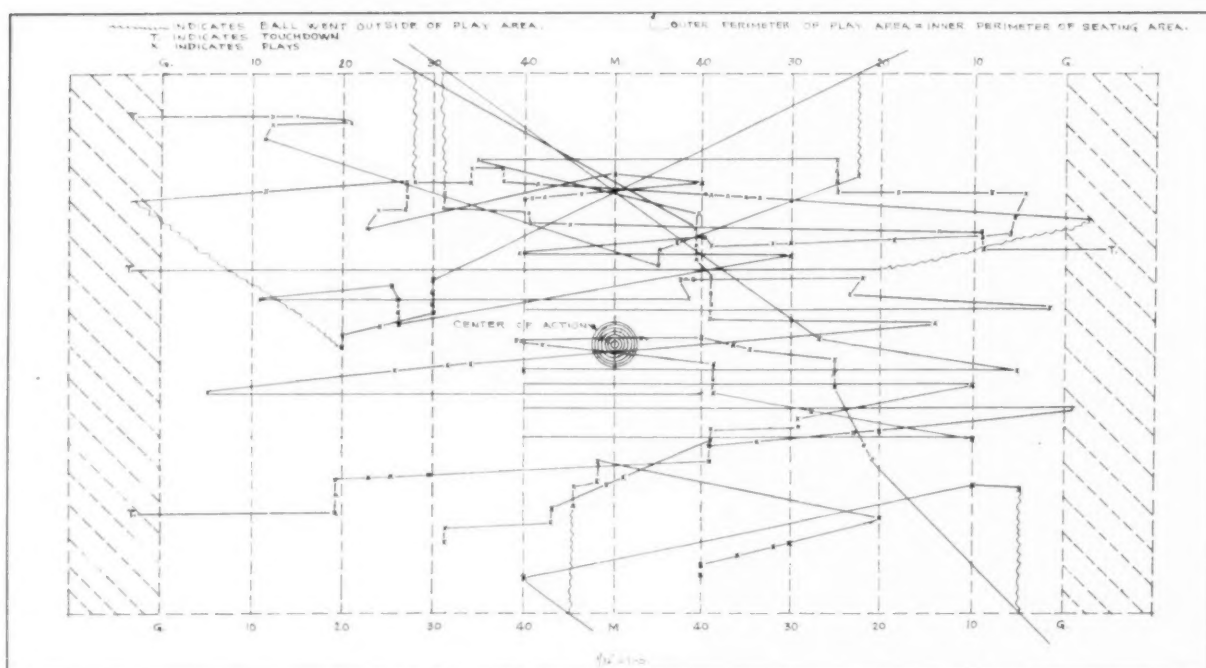
The minimum football play area is 200 by 400 feet, allowing 20 feet clearance beyond boundaries of official field.



A typical play area for football and track athletics. The track tangents may be extended for 200-yard straightaways. This is the usual layout hitherto used in educational and municipal stadiums. Official baseball cannot be played in this play area layout without ground rules, thus reducing greatly the usefulness and income value of the stadium.



The minimum baseball play area with 300-foot foul lines of equal length and 60 feet to 20 feet clearance at foul lines. All the space outside the perimeter is available for seating accommodations.



FOOTBALL ACTION LINES, NOTRE DAME-UNIVERSITY OF SOUTHERN CALIFORNIA GAME, 1930

it is impracticable to use oval tracks. The track layout must conform to the shape of the play area or the play space available. Hence such layouts are pear-shaped as in the Yankee Stadium, rectangular with rounded corners, or circular with a 100-yard straightaway across the field. Moreover, when conditions require, the lap distance may be reduced to one-fifth of a mile.

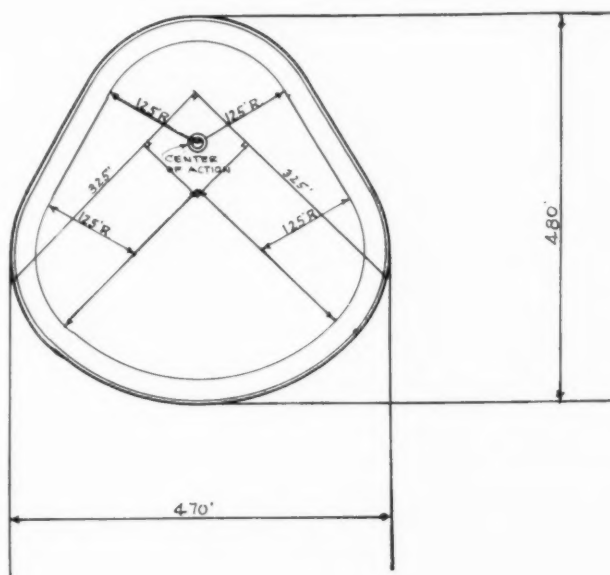
The problem of laying out running tracks in connection with baseball fields is one that requires careful study for each individual stadium, and with the necessity for providing good view, in so far as spectators are concerned, is one that will challenge the ingenuity of the stadium designer. A running track of any shape or distance is better than nothing at all; regardless of lack of conformity to the usual layouts such a track will add greatly to the usefulness of a stadium.

Other Attractions

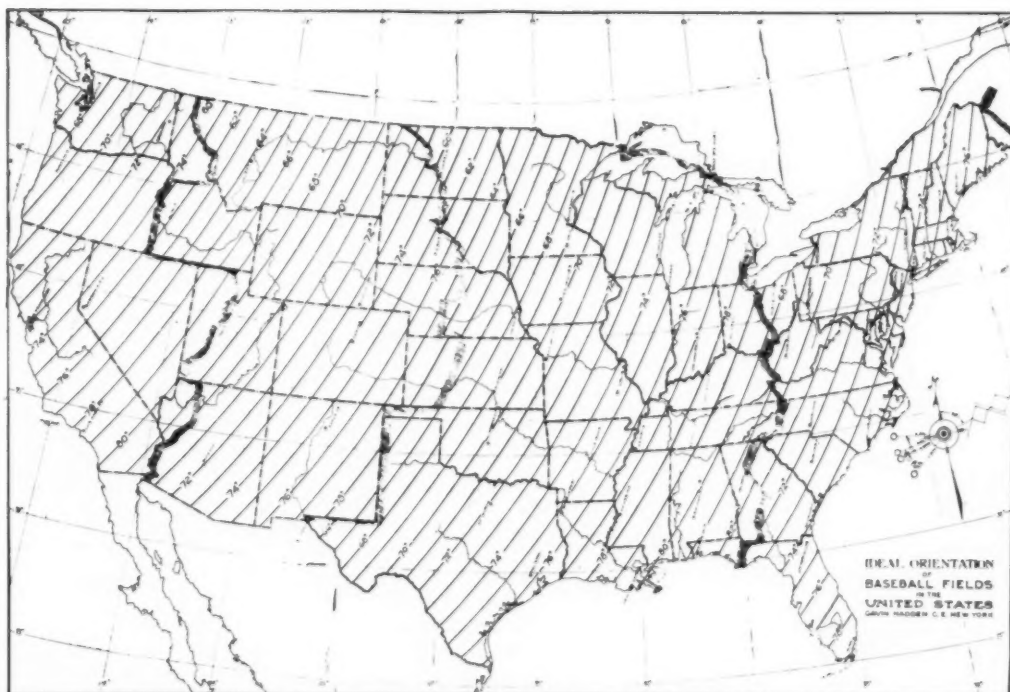
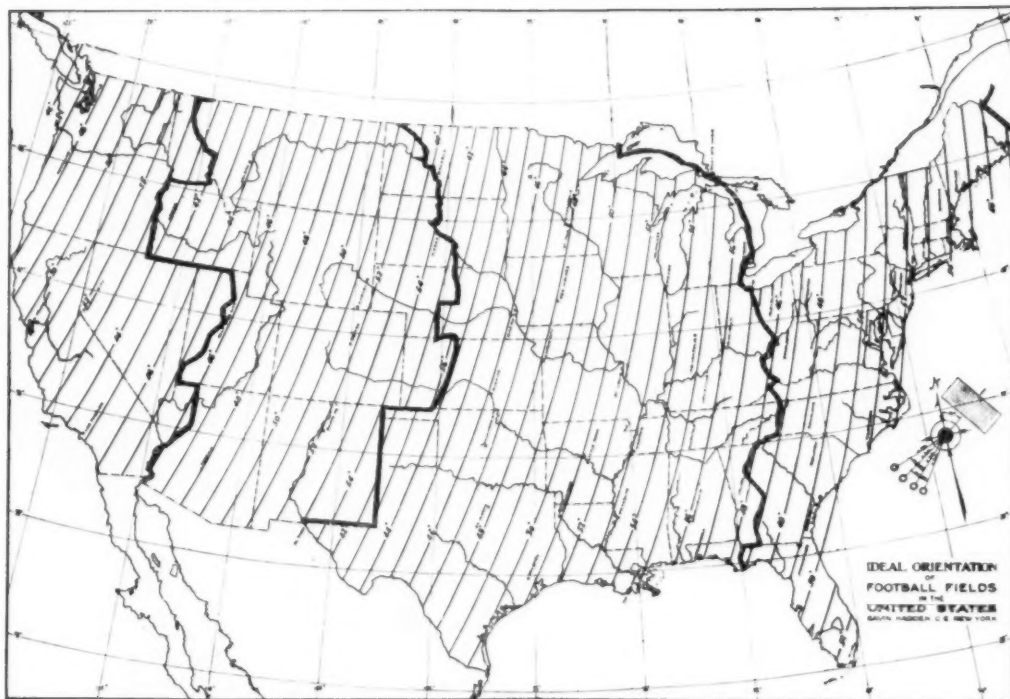
The game of soccer or association football is similar in field requirements to that of football. Hence the football play area will accommodate soccer as well.

If provisions are to be made for exhibiting boxing and wrestling the space necessary for the performers is easily provided. A clear space of 30 feet square is required. The ring is elevated about 4 feet above grade. The greatest difficulty arises out of the necessity for providing good view, especially in behalf of ringside spectators. Good view is also a major consideration when the stadium is used for concerts, lectures, tennis, and the like.

Sketch illustrates locus of action points during a football game. The center of action is in the center of the play area.



Egg-shaped play area for baseball with one quarter mile running track. The tangents may be extended for 220-yard straightaways. This layout may be used for baseball, track athletics, and football.



IDEAL ORIENTATION OF FOOTBALL AND BASEBALL FIELDS

These maps, developed by Gavin Hadden, engineer, determine at a glance the ideal direction of the minor axis of football fields, based on a playing period from 2 p.m. to 4 p.m. between September 27 and November 27, and of baseball fields, based on a period from 3 p.m. to 5 p.m. between March 21 and September 21. Two choices of orientation are possible for baseball fields, as shown on the map to the right of the north arrow.

Orientation

Orientation refers to the azimuth of play area axis. The axis or center line of the football stadium is a longitudinal line passing through the goals. In the baseball stadium it is a line passing through home base and second base. The azimuth of this line or its angle with the true north is the orientation of the stadium.

Orientation concerns the effect of the sun's direct rays on public and players. During the summer months this matter is of prime importance in baseball stadiums. In major league baseball stadiums where the bid for public patronage is supported by careful provisions for the comfort and convenience of patrons, the better seats are shaded by proper orientation and roofs. With the exception of batter and catcher, the players must "take the sun."

Careful computations are required to determine the correct orientation to meet local conditions. For amateur games experts heretofore have considered mainly the comfort of players. This is a matter for careful consideration, for it is always possible to average the discomfort by shifting the glare to a portion of the seating area.

As football is a fall-season attraction the sun is usually welcome, especially near the end of the year. In ordinary cases the axis should be at right angles to the sun's azimuth. At 3 o'clock for the larger part of the United States the sun's azimuth is due west. Hence the football field axis is approximately north and south.

Drainage

Good drainage requires provision for both surface and underdrainage. Run-off by surface drainage is provided by grades of one-half to three-quarters of 1%. Such grades drain moisture quickly to inlets, gutters, blind drains and sewers. Where moisture cannot drain directly to gutters, open vents or vertical tee inlets to drains or sewers may be used. These may be provided with removable tops, rubber-capped, which are kept in place only during games.

The function of underdrainage is to remove excess moisture from the subsurface between rains. Good underdrainage means a porous soil texture which will absorb precipitation. The drains draw off this moisture and lower the water line, the result producing what athletes refer to as a "springy" field in contrast with hard playing fields which are troublesome to their legs.

For average conditions underdrainage should consist of 6-inch drain tile lines on 50-foot centers, properly connected to sewers. These are minimum requirements. It is advisable to secure expert advice from consultants familiar with local conditions.

Surfaces

Play areas are finished mainly by seeding and sodding, with cinder finish for running tracks and bare or

"skinned" areas for base lines of baseball diamonds. The diamond consists of a flat turtleback or very low pyramid, with the four bases at the same elevation and the pitcher's mound elevated 12 inches or more above the base lines. This grading insures rapid surface drainage of the diamond.

An excellent play field for football is prepared by placing a 10-inch layer of cinders over the entire field, to be covered with another layer of sandy loam, and finished with blue grass sod.

A very good running track consists of a 12-inch layer of cinders under a 4-inch top layer of one part clay and three parts $\frac{1}{4}$ " screened cinders, the running track of 21-foot width being pitched 2 inches toward the inner edge. The wearing surface is a $\frac{1}{2}$ " dressing of $\frac{1}{4}$ " screened cinders, all to be thoroughly compacted by rolling. In some localities local crushed shell is used in place of cinders.

Combination Play Areas

The football season includes the three fall months. Track and field athletics occur during the spring. Baseball is played the six months of spring and summer. Thus the football season follows baseball, the two combining to provide a continuous season of outdoor athletic competition during all that period when outdoor attractions can be exhibited under weather conditions prevailing in the more densely populated sections of our country.

Football attracts approximately fifteen million attendance during its three months of play, while baseball in six months draws about twenty-five million. These estimates include all games—professional, collegiate, scholastic and local.

It is evident that both games are of approximately equal national importance and that stadiums designed to attract large crowds should provide adequate play area layouts for these games. The economy of designing a stadium to accommodate players and public for both football and baseball is obvious. Since the baseball play area is larger than the space for football, it is necessary to fit the football area into the baseball field, providing removable seating where needed, to adjust the seating area to the respective games. Good view is of fundamental importance to spectators and ample unobstructed play area is needed for the players. If baseball or football play occurs over the running track, the regulation track curbs may be omitted and the track graded continuous with the playing field.

SEATING AREAS

The seating area is the part of the stadium allotted to the spectators. This area is built generally as an ascending series of seat tiers.



DYCHE STADIUM, EVANSTON, ILLINOIS
 JAMES GAMBLE ROGERS, ARCHITECT
 GAVIN HADDEN, ENGINEER



BROWN STADIUM, PROVIDENCE, R. I.
 PAUL P. CRET, CONSULTING ARCHITECT
 GAVIN HADDEN, ENGINEER

Stands and Bleachers

By stands are meant that type of seating in which the entire deck construction is solid, the risers serving structurally to carry loads to inclined stringers and thence to columns and foundations to which the support framework is permanently attached. In stand construction the seats are fastened to treads or risers.

The term bleachers refers to that type of seating in which the riser space is left open, the load burden resting entirely upon treads which transmit loads to inclined stringers. Knockdown or portable bleachers are designed for easy dismantling for storage or removal to another location. Permanent bleachers are securely fixed to foundations. In bleacher construction the seats are fastened to the inclined stringers.

Permanent bleachers are used for seating when sufficient funds are not available for better construction. Portable bleachers are useful in providing extra seats for big games. They are necessary in the adjustment of the seating area in combination play fields. The best makes of bleachers are designed with structural steel support framework and wood treads, which should not exceed more than a 5-foot span between stringers.

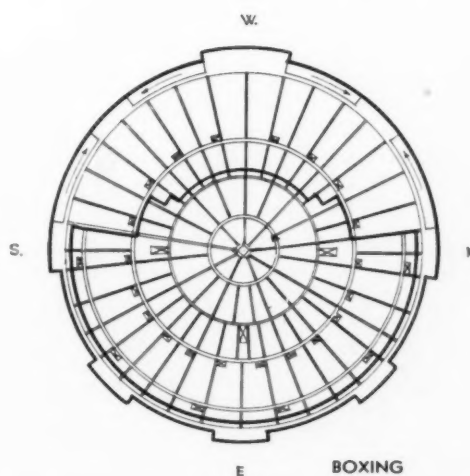
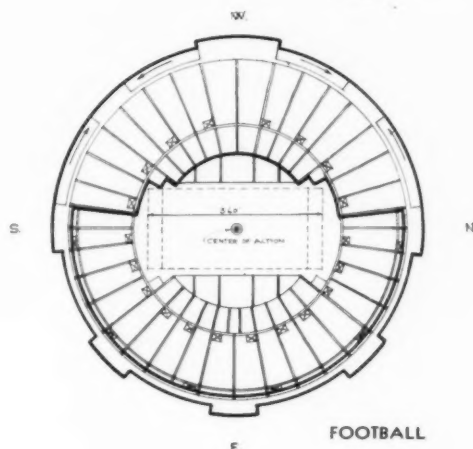
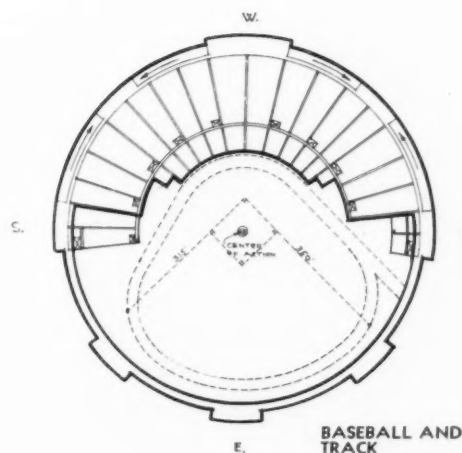
Stand decking may be built on an inclined cut or fill. When stands are roofed over, they are referred to as grandstands.

Stand Construction

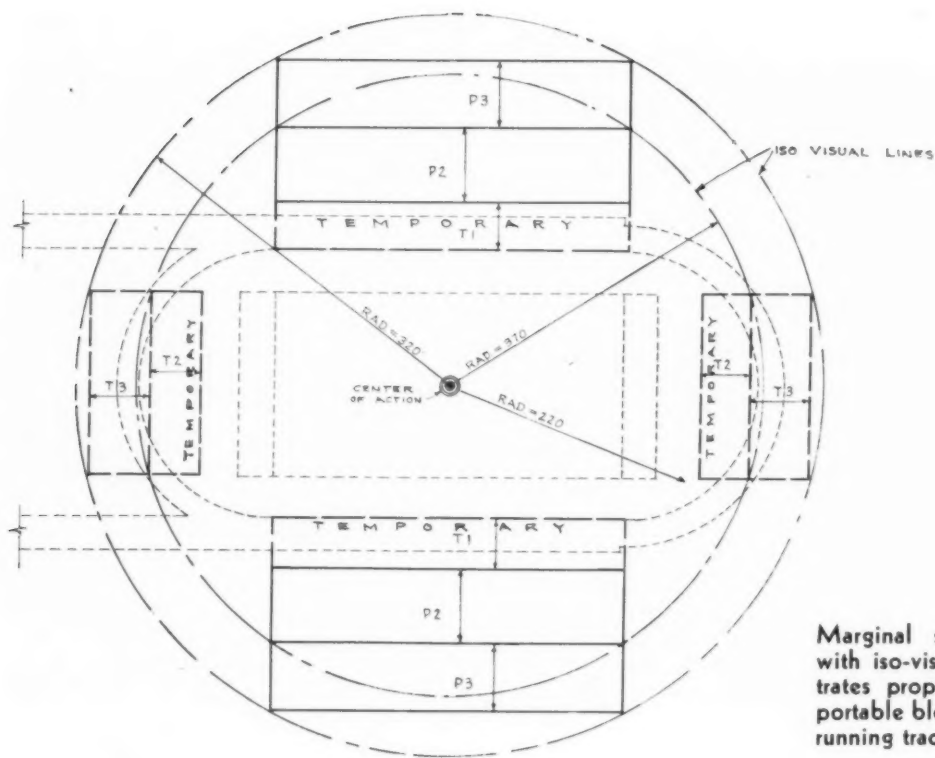
The important factors in stand construction are seats, railings, facade, decking, support framework, fire resistance, stability, weather resistance, erection, and true cost.

Seats. Commercial seating may be purchased from several large manufacturers who specialize in this work. These seats are fastened to the decking. They are often used for box and reserved sections of baseball stadiums and average about three dollars per person. This cost may be reduced by the use of built-up seats, which are attached to risers or treads. Comfortable seats are provided with backs and should be about 18½ inches in width. There should be ample leg room by allowing about 30 inches between rows. Sharp points that catch and tear clothing should be avoided. If seat brackets are attached to risers, the cleaning-up-after-games task is greatly facilitated.

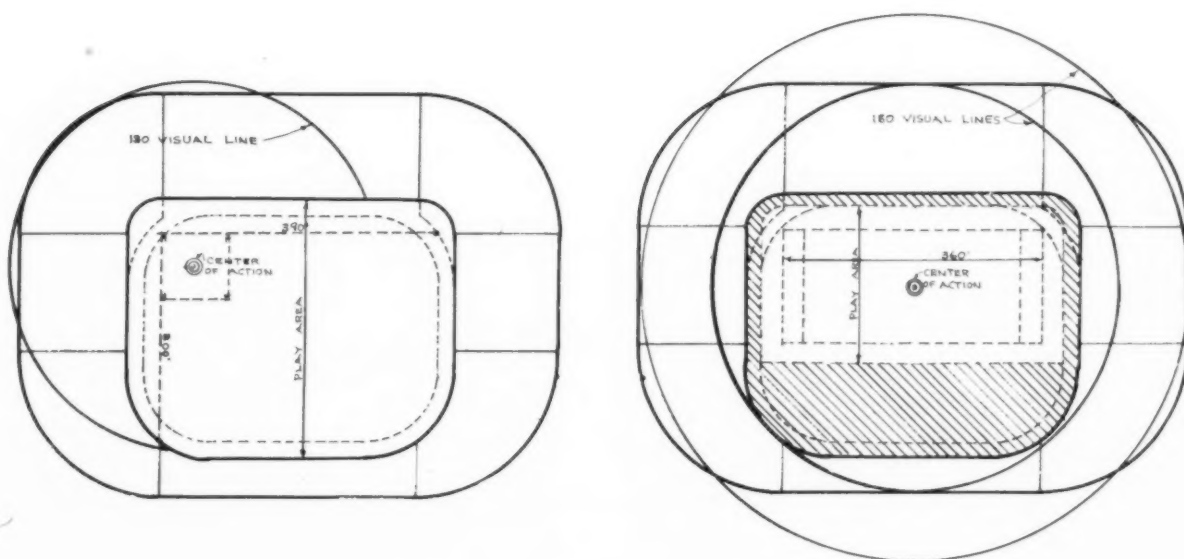
Railings. Solid masonry railings are expensive and cut off light and ventilation. Pipe railings are more desirable. With wire mesh panels, they are placed around the outer perimeter and around vomitories. Double or single railings are needed at the inner perimeter and for separation of the various seat classifications. Mesh is usually 8-gauge crimped wire with channel or round frames. Pipe is 1½" to 2" with threaded or welded connections, preferably the latter.



Municipal combination stadium designed for baseball, football, track athletics and boxing exhibitions. Marginal seats coincide with extreme iso-visual line, thereby assuring good view on iso-visual basis. The centers of action for baseball, football and boxing are at the center of the circle. Removable bleachers are an important feature of this design, prepared by Myron W. Serby, stadium consultant, for the Veterans Memorial Stadium at Jersey City.



Marginal seats should coincide with iso-visual lines. Sketch illustrates proper method of locating portable bleachers for football over running track.



Rectangular play area designed for baseball, track athletics and football. Removable bleachers definitely incorporated in the design. End zone football seats are inferior to sideline seats on iso-visual basis. This layout is not suitable for good view at boxing exhibitions.



Arch-P. C. A.

THE YANKEE STADIUM NEW YORK CITY

OSBORNE ENGINEERING COMPANY

The parking problem is serious, as illustrated in this air picture of the stadium during a football game. A thousand or more cars could be accommodated by parking decks within the stadium.

Facade. The cost of a masonry facade with its huge arches and pylons is rarely justified if funds are limited. The money might well be spent for better or more seating, inside parking, floodlights, etc. A clean structural design of the facade will serve its major purpose in supporting and bracing the outer perimeter of the seating deck.

Decking. Treads and risers compose the decking. Many decks consist of monolithic reinforced concrete treads and risers. Treads may be of poured or precast concrete slabs on structural steel risers. A recent development is a monolithic construction in which both treads and risers are of structural steel. This battledeck construction consists of risers of built-up welded Z members supporting $\frac{1}{4}$ " steel tread plates at top and bottom flanges. The riser joists are delivered to the job with seat brackets attached. The plates are painted or surfaced with a finish of asphalt.

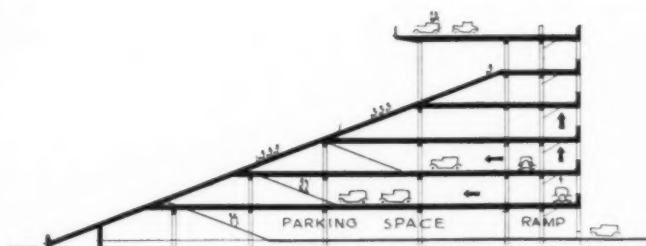
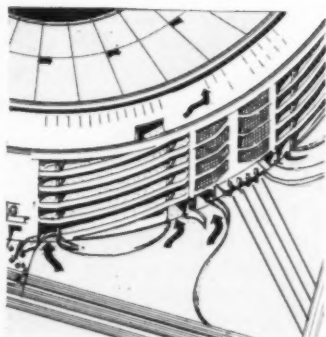
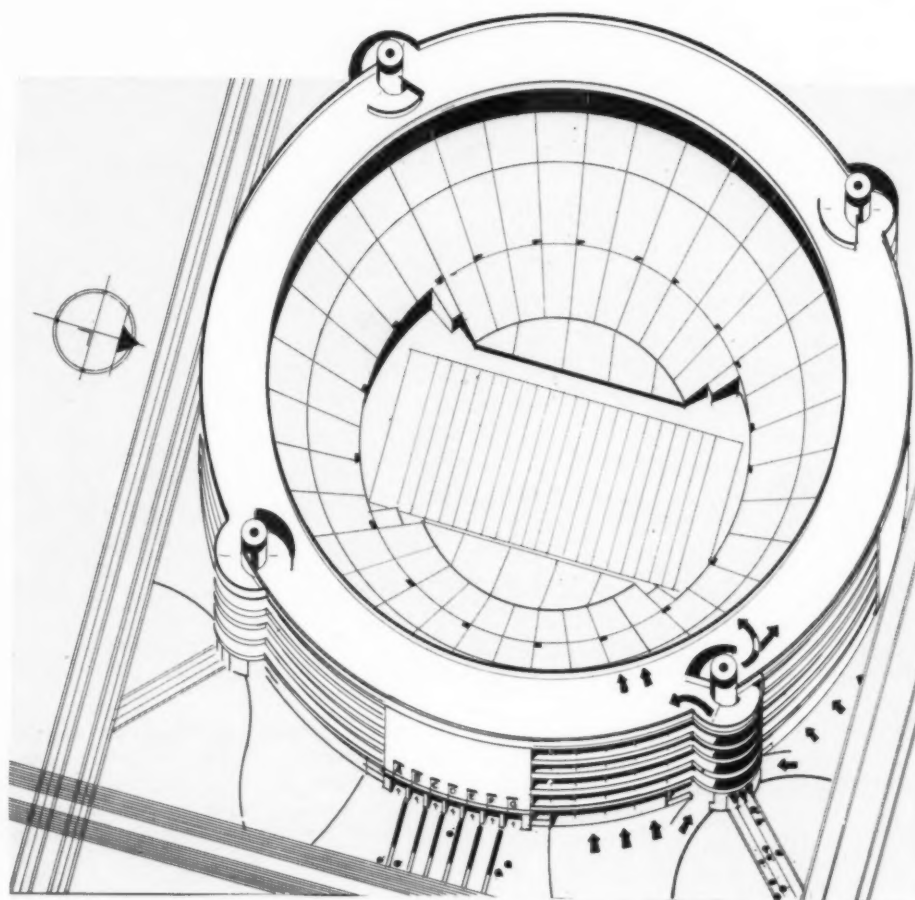
Support Framework. Unless site conditions favor cut-and-fill earth construction it is necessary to support the decking by means of structural framework, which may be of reinforced concrete or structural steel. In many stadiums the first eight or ten rows of decking are supported on earth fill. The struc-

tural design must consider all live and dead loads and must also provide against the lateral stresses due to crowd action.

Fire Resistance. This depends upon the percentage of wood used in the stands. Hence modern stadiums avoid wood for decking or support framework. Wood is used for seat slats and backs and for grandstand roofs.

Stability. This factor involves structural design. The decking should be designed to withstand, without sway or excessive vibration, a live load of 100 pounds per square foot vertically applied and a horizontal load of 8 pounds per square foot. All members of the support framework must be solid enough to carry maximum loads without sway or excessive vibration. Bracing and fastenings should be adequate. Where low bearing soil values obtain, requiring large spread footings or piles, light weight structural materials are economical and their use will avoid misgivings due to excessive settlement.

Weather Resistance. This involves cost of upkeep. Concrete deteriorates quickly if the utmost vigilance during construction has not been maintained. From season to season alternate contraction and expansion occurs from freezing and thawing. Precast concrete



STADIUM DESIGN WITH PROVISION FOR PARKED SPECTATORS

This scheme, developed by K. Lönberg-Holm and S. Washizuka, permits use of upper roof deck as space for parked spectators. Lower levels could be used similarly.

Upper drawing shows circular ramp arrangement utilizing the four corners of a square lot for automobile entrances. Lower drawing is an alternate arrangement incorporating straight-run ramps into the permanent stand construction.

slabs provide a multiplicity of expansion joints which eliminate cracking. They were first used on the Harvard stadium. Battledock construction yields to foundation settlement without structural fracture and will take up temperature changes due to its inherent elasticity.

Erection. As with all modern structures, there is a growing tendency to design stands with a maximum of shopwork where manufacturing organization and equipment obtains. Under these conditions inspection is easily made, and field work greatly simplified and speeded up. This trend has entered the stadium field, leading to the use of fabricated structural steel for decking and support framework.

True Cost. This is the first cost plus the later charges for upkeep, i.e., maintenance and depreciation. The upkeep factor is of primary importance in stadium stand construction because the functional elements—the treads and risers—are exposed to weather the year round in contrast with floors of buildings which are enclosed.

Roofs

The use of roofs in connection with outdoor exhibition structures for the purpose of shading spectators from the sun dates back to Roman times. Great awnings were used to shade the stands of the Coliseum. They were adjusted by means of ropes fastened to the parapet.

Roofs are a necessity during the baseball season, and are also required for press and broadcasting accommodations during the football season. Roof location and width must be designed to provide shade for the entire section of grandstands. (See *Oriental*.)

Multiple Decks

Multiple decks are usually built in connection with stadiums on expensive land. While they bring the spectators nearer to the play, they are usually deficient as to good view clearance. Most rear seats under the decks do not afford a good view of high flies in baseball. A further difficulty arises from the need for ramping crowds to the upper decks, involving increased construction costs. In most cases single decks are more economical and efficient. Before a decision is made as to single or multiple decks, alternate designs and estimates should be prepared and considered in connection with good view, land costs, and relative total costs.

Parking Decks

The automobile parking problem promises to increase in seriousness. Those who have driven to large games will remember keenly the inconvenience and discomfort involved. If half the patrons come in cars, one acre of parking space is needed for each three thousand stand capacity. The large stadium requires ten acres or more of parking space.

A portion of this required space may be supplied by parking decks below the seating deck where there is a vast volume of waste space which can be utilized profitably in this manner. Ramping arrangements are easily provided, the net result being a further addition to public comfort and convenience.

Parked Spectators

A further concession to public convenience provides for parking aisles on the stadium decks. Seated in their cars with a good view of the playing field, these spectators would be located behind the seated patrons or on the roof. It is necessary to have a wide aisle around the perimeter and the necessary ramps from parking decks below.

Good View

The successful stadium is designed to serve the public. Of all the factors that contribute towards this end, that of providing for spectators a good view of all points of interest on the play area is most important. Good view requires that spectators enjoy nearness to the attraction and clearance or freedom from obstructions. The plan of the seating area determines nearness; the slope of the seating deck determines clearance.

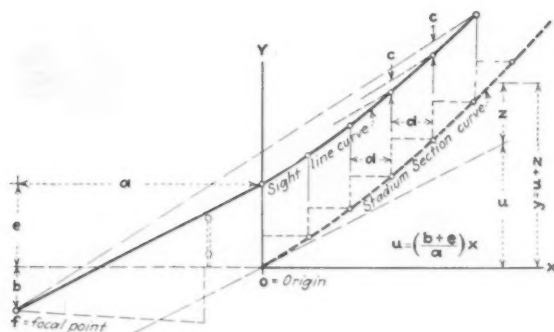
The Nearness Factor of Good View. The inner perimeter of the seating area is the outer perimeter of the play area. Obviously, seating on this perimeter is most desirable from the point of view of the spectator who wishes to see the attraction as near as possible to the field of action.

The center of action in the football play area is in the exact center of the 50-yard line. In the baseball play area, this center is the center of the diamond.

From these considerations it is evident that spectators, seated along the arc of a circle with center at the center of action, will derive nearly equal satisfaction in witnessing these games, other things being equal. This arc is usually referred to as the iso-visual line. These iso-visual lines are concentric and may not coincide with the layout of the rows of seats.

The marginal seats are those along the outer perimeter of the seating area. They are the least desirable when judged from the factor of nearness. Most football stadiums are provided with marginal seating of widely varying degrees of spectator satisfaction. Seats behind the end zones are much less desirable than marginal seats opposite the 50-yard line at the center of attraction.

In a well-proportioned seating plan, the marginal seats should coincide with the iso-visual line. This means that the marginal spectators will be nearly equidistant from the center of attraction and will derive approximately equal satisfaction on the basis of nearness.



DESIGN DATA FOR DETERMINING STADIUM SECTION CURVES:

Values of z in feet from Formula:

$$z = (0.46) (a+x) \log_{10} \left(\frac{x}{a-1.25} + 1 \right)$$

See diagram on opposite page. For other values of a and d , apply coefficients from table opposite. Values of z in feet for different values of a and x when $c = 0.50$ feet and $d = 2.50$ ft.

TABLE 1

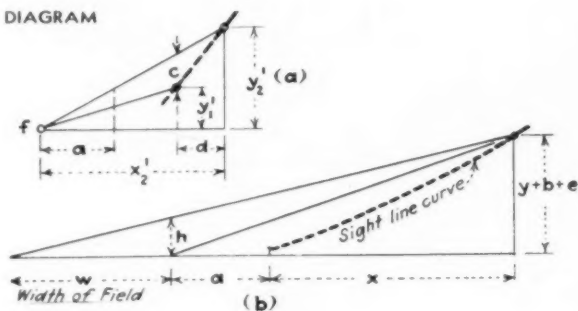
x Ft.	VALUES OF a IN FEET																x Ft.
	20		40		60		80		100		200		300		400		
0	0.00	diff.	0.00	diff.	0.00	diff.	0.00	diff.	0.00	diff.	0.00	diff.	0.00	diff.	0.00	diff.	0
10	2.56	2.56	2.30	2.30	2.20	2.20	2.15	2.15	2.12	2.12	2.06	2.06	2.04	2.04	2.03	2.03	10
20	5.80	3.24	4.99	2.69	4.69	2.49	4.53	2.38	4.43	2.31	4.22	2.25	4.15	2.17	4.11	2.13	20
30	9.55	3.75	8.03	3.04	7.43	2.74	7.10	2.57	6.90	2.47	6.47	2.33	6.32	2.22	6.24	2.17	30
40	13.70	4.15	11.34	3.31	10.39	2.96	9.86	2.76	9.52	2.62	8.80	2.42	8.54	2.29	8.41	2.22	40
50	18.18	4.48	14.91	3.57	13.55	3.16	12.78	2.92	12.29	2.77	11.22	2.42	10.83	2.29	10.63	2.22	50
60	22.95	4.77	18.70	3.79	16.88	3.33	15.86	3.08	15.19	2.90	13.72	2.50	13.18	2.35	12.90	2.27	60
70	27.97	5.02	22.69	3.99	20.39	3.51	19.08	3.22	18.22	3.03	16.29	2.57	15.58	2.40	15.20	2.30	70
80	33.21	5.24	26.87	4.18	24.05	3.66	22.43	3.35	21.36	3.14	18.94	2.65	18.03	2.45	17.55	2.35	80
90	38.66	5.45	31.21	4.34	27.86	3.81	25.91	3.48	24.62	3.26	21.67	2.73	20.54	2.51	19.95	2.40	90
100	44.28	5.62	35.71	4.50	31.80	3.94	29.51	3.60	27.98	3.36	24.45	2.78	23.10	2.56	22.38	2.43	100
110	50.07	5.79	40.33	4.62	35.86	4.06	33.21	3.70	31.44	3.46	27.31	2.86	25.71	2.61	24.85	2.47	110
120	56.02	5.95	45.11	4.78	40.04	4.18	37.02	3.81	34.99	3.55	30.23	2.92	28.36	2.65	27.36	2.51	120
130	62.11	6.09	50.00	4.89	44.33	4.29	40.93	3.91	38.64	3.65	33.22	2.99	31.07	2.71	29.91	2.55	130
140	68.33	6.22	55.02	5.02	48.73	4.40	44.94	4.01	42.37	3.73	36.26	3.04	33.82	2.75	32.50	2.59	140
150	74.68	6.35	60.15	5.13	53.23	4.50	49.04	4.10	46.19	3.82	39.36	3.10	36.62	2.80	35.13	2.63	150
160	81.14	6.46	65.37	5.22	57.82	4.59	53.21	4.17	50.09	3.90	42.52	3.16	39.46	2.84	37.79	2.66	160
170	87.72	6.58	70.70	5.33	62.50	4.68	57.49	4.28	54.06	3.97	45.74	3.22	42.34	2.88	40.48	2.69	170
180	94.40	6.68	76.12	5.42	67.27	4.77	61.84	4.35	58.11	4.05	49.01	3.27	45.27	2.93	43.21	2.73	180
190	101.18	6.78	81.64	5.52	72.13	4.86	66.26	4.42	62.23	4.12	52.33	3.32	48.24	2.97	45.98	2.77	190
200	108.05	6.87	87.25	5.61	77.07	4.94	70.77	4.51	66.42	4.19	55.70	3.37	51.25	3.01	48.78	2.80	200
210	115.02	6.97	92.93	5.68	82.08	5.01	75.34	4.57	70.67	4.25	59.13	3.43	54.30	3.05	51.62	2.84	210
220	122.08	7.06	98.69	5.76	87.17	5.09	79.98	4.64	74.99	4.32	62.60	3.47	57.39	3.09	54.48	2.86	220
230	129.22	7.14	104.54	5.85	92.32	5.15	84.69	4.71	79.38	4.39	66.12	3.52	60.52	3.13	57.38	2.90	230
240	136.43	7.21	110.46	5.92	97.55	5.23	89.46	4.77	83.82	4.44	69.69	3.57	63.68	3.16	60.31	2.93	240
250	143.73	7.30	116.45	5.99	102.84	5.29	94.29	4.83	88.32	4.50	73.30	3.61	66.89	3.21	63.27	2.96	250

COEFFICIENTS FOR OTHER VALUES OF c AND d

TABLE 2

d Ft.	VALUES OF c IN FEET							
	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65
2.00	0.748	0.873	0.997	1.122	1.246	1.371	1.495	1.620
2.08	0.718	0.838	0.957	1.077	1.196	1.316	1.435	1.555
2.17	0.690	0.805	0.920	1.035	1.150	1.265	1.380	1.495
2.25	0.665	0.776	0.886	0.997	1.108	1.219	1.329	1.440
2.33	0.642	0.749	0.856	0.962	1.069	1.176	1.283	1.390
2.42	0.619	0.723	0.826	0.929	1.032	1.136	1.239	1.342
2.50	0.600	0.700	0.800	0.900	1.000	1.100	1.200	1.300
2.58	0.581	0.678	0.775	0.872	0.969	1.066	1.162	1.259
2.67	0.564	0.658	0.752	0.846	0.940	1.033	1.127	1.221

DIAGRAM



This principle indicates that the ideal outer perimeter of the seat area is a circular arc. The Greeks employed this in their theatres and our modern theatre design is based on precisely the same reasoning. But recent stadium designers seem to have overlooked this factor, following the lead of the Greek stadium designers who likewise provided parallel inner and outer seating area perimeters, probably for the reason that large capacities were not required.

Large stadiums having capacities up to 125,000 or 150,000 should be carefully planned to insure a maximum number of good view seats on a nearness basis.

Visual Clearance Factor of Good View. For any stadium section, the position of a spectator seated in the first row largely determines the design. The sight line curve, an assumed smooth curve passing through the eyes of spectators up the section, is fixed as to locus by the elevation of the eyes of the first spectator with relation to a definite focal point on the field taken as the origin. The focal ray of each spectator clears the eyes of each spectator immediately below by a vertical distance " c ". Although oblique sections are often investigated in stadiums, the section design is based on a section taken normal to the inner perimeter of the seating area.

Taking " e " as the vertical measurement from floor to eyes of the average seated spectator, and changing the origin of the curve from the field focal point to a new origin at the base of the first riser, we obtain by transformation the corresponding stadium section curve, which can be used directly to lay out the treads and risers. Table 1 gives data for plotting the section with given values of " a " and " x ". In this table the tread width is taken as 30 inches and the " c " value as 6 inches. For other values of tread width and clearance, Table 2 gives multipliers.

Discussion of the *Clearance Formula Constants* is given herewith:

" a "

The " a " or sight distance is taken as the distance from first row to the nearest point of play interest. In football this is the distance from first row to sidelines. In baseball it is the distance from first row to catcher or to foul lines, whichever is nearer. In track it is the distance from first row to center of track, the focal point being taken at the runner's waist height or 3 feet above grade. This involves consideration of the " b " factor.

" b "

This constant represents the vertical distance from focal point to first tread of the seating deck. It may be a negative quantity when the focal point is above the first tread. This condition occurs when the focal point is the boxing ring elevated above grade. In multi-deck stadiums, the " b " constant is of major importance. In football stadiums this distance is 2 to 3 feet. This rise above grade provides for the installation of removable bleachers in front of the permanent stands and over the running track.

" c "

The " c " or clearance constant is the measure of visual clearance, defined as the distance vertically



C. Manion from Gateway

MEMORIAL STADIUM, UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA

JOHN GALEN HOWARD, ARCHITECT
E. E. CARPENTER, CONSULTING ENGINEER

from a spectator's focal ray to the eyes of his preceding neighbor. For ideal clearance, this value is 6 inches when heads are covered and 4 inches for uncovered heads as in theatres. When these "c" values obtain, there is absolute clearance from row to row. Absolute clearance is easily provided in stadiums of small capacities. In large stadiums having fifty to a hundred rows of seats the calculated heights of the structures exceed reasonable limits. Under these conditions clearance is limited and requires spectators to look between the heads and over the shoulders of preceding neighbors.

In most large stadium designs it is necessary to adopt limited clearance values, which should be fairly uniform for all seats. Spectators will then have a good view of the attraction, except when the action is near the seating area inner perimeter.

The investigation of the value of "c" is of the utmost importance when a stadium design requires seating accommodations for baseball, football, and boxing. Especial attention should be paid to the clearance of seating between ringside and stands.

"d"

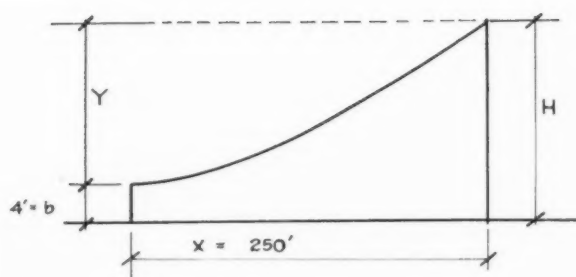
This is the width of treads or back to back distance between seats. Seats with backs should be on 30-inch rows, without backs on 28-inch rows.

"e"

This constant is the height of a spectator's eyes above the tread. As most stadiums are designed for seated spectators, this value is taken as 4 feet. It is interesting to note that many European stadiums, notably that at Wembley Park in London, provide for standing spectators. At Wembley Park over 90,000 standees lean against pipe railings provided for the purpose. In this case the proper "e" value is the standing height from tread to eyes, an increase which requires increased slope of the seating deck.

Example: to determine the maximum height of a section consisting of 100 rows at 30 inches, first tread being 4 feet above field grade. We have the following constants:

- | | | |
|----|-----------|-----------|
| a. | 100 feet | (assumed) |
| b. | 4 feet | (given) |
| c. | 6 inches | (assumed) |
| d. | 30 inches | (given) |
| e. | 4 feet. | (assumed) |



H (total height) equals y plus 4 feet (b)

$$y = u + z$$

$$u = \left(\frac{b+c}{a} \right) x = \left(\frac{4+4}{100} \right) 250$$

$$= 20 \text{ feet}$$

$$z = 88.32 \text{ feet}$$

$$y = 108.32 \text{ feet}$$

$$H = 102.32 \text{ feet}$$

The designer may desire to reduce this total height to 90 feet, or a cut of practically 22 feet. This is 25% of the z value derived above. The section is therefore computed on a basis of 75% of the values given in the table for $a=100$ feet and $d=30$ inches. On this basis the calculated "c" value for the above value of "a" and "d" is 75% of 6 inches or $4\frac{1}{2}$ inches, which is limited clearance. It may be seen from the table that for absolute clearance of 6 inches the final design indicates an "a" value of about 200 feet.

ACCESS AND EGRESS

Site

Selection of the proper site involves consideration of accessibility, ample area, neighborhood, grading and foundation conditions. Accessibility requires that there exist present or potential transit facilities and ample paved thoroughfares for motor traffic without bottlenecks. If the site is quickly and easily reached, it may be located beyond the outskirts of the city. Here land costs are usually low and may be sold at a profit when the site greatly increases in value in the future.

The modern stadium requires area for the stadium proper as well as parking space for the public. Allowing one acre of parking for each five thousand capacity, the fifty thousand capacity stadium will require ten acres. Parking decks in the stadium will relieve a portion of this requirement, but the larger part of the large stadium parking will necessarily require outside space. If public convenience is considered, the practice of compelling motorist patrons to park dozens of blocks away from the stadium and in miscellaneous side yards is greatly to be deplored.

The stadium proper will require from 5 to 15 acres and upwards depending on capacity. To provide a

certain degree of landscaping, there should be some area outside the enclosure to dignify the structure.

The selection of neighborhood creates a problem that has prevented the realization of many stadium projects. This matter of realty technique should be left to experts who fully appreciate the effect of a stadium on its environment. The problem is no more difficult than that of choosing sites for schools or playgrounds.

Preliminary test holes or core borings should furnish foundation information. A topographical survey should be made in this connection and all this information used in the preparation of the estimate. Many preliminary stadium estimates have gone wrong due to lack of knowledge of grading and foundation conditions, including drainage problems. If the site is favorable for a cut-and-fill stadium, alternate estimates may be made against the structurally supported type. In investigating the cut-and-fill design, due consideration should be given to drainage cost, pumping, etc., and the need for sheltering crowds in case of rain.

Entrances and Ticket Booths

The stadium crowd enters during a relatively long period, i.e., one-half hour to an hour. The rate gradually increases toward the start of game. A good ticket seller can handle from 1,500 to 2,000 sales per hour. Each booth shelters two sellers and will require two aisles. The booth requirements will therefore determine the width of the entrances. For the peak crowd games temporary booths may be located at some of the exits. Usually separate entrances are provided for bleacher crowds. If the stand crowds are divided into box section, reserved and unreserved, suitable guarded railings inside the entrances will shunt them into their respective primary channels of distribution under the stands.

Ramps, Portals and Exit Gates

The primary channels of distribution consist of the aisles at grade under the decks, together with the ramps leading to their respective portals or vomitories. These channels should not include steps which are dangerous under stadium conditions.

Ramps should be non-skid surfaced and sloped one to four-and-a-half or five, with landings at 15- to 20-foot levels. The width of ramps, portals and exit gates should be interrelated. This width depends on the exit requirements. It is advisable to base these requirements on a 5-minute exit of the entire crowd. On this basis a 10,000 crowd will require 80 lineal feet of ramp, portal or exit gate width. This is on an assumption of 3 feet square walking space for each person, traveling at 3 miles per hour, with a factor of safety of two. Using these figures, a 10-foot wide vomitory will take care of 1,250 people. If the vomitory allowance is smaller than



Kurt Grimm

STADIUM AT NUREMBURG
OTTO SCHWEIZER, ARCHITECT

that for ramps and exits, the crowd will bottleneck at the vomitory during egress.

Careful study should be given to the location and design of these three elements. At many stadiums the crowd is permitted to exit across the playing field. This greatly decreases any hazards arising from panics and mad rushes which often occur in the excitement of athletic competition.

Longitudinal and Transverse Aisles

These are the secondary channels of distribution, leading the crowds from the vomitories to their seat rows. Longitudinal aisles are provided from vomitory to vomitory and should be at least 5 feet in width. There should be at least two: one between the box section (or front section of 8 or 10 rows) and the reserved seating, and one at the rear of the seating. Some designs indicate longitudinal aisles in front of the seating at grade and also an additional intermediate longitudinal aisle between the lower aisle and the outer perimeter.

In this connection it should be understood that aisles obstruct view when late comers are moving to their places, and there should therefore be as few aisles as possible. For this reason the marginal rear aisle is desirable and it may also be used for standing room at peak games.

Transverse aisles extending up the deck are usually spaced 30 to 50 feet apart. When riser heights exceed 9 inches intermediate steps are required. It is desirable for safety that all runs be uniform. Therefore intermediate treads and risers should be half the dimensions of main treads and risers, i.e., when

main treads and risers are 10 inches and 30 inches, the step blocks should be 5 inches by 15 inches. The usual width of transverse aisles is 3 feet.

STADIUM EQUIPMENT AND CONVENIENCES

The total cost of the stadium includes the cost of the land required for the stadium proper and outdoor parking space plus expenditures for preparing surfaces for use, the cost of the permanent and removable seating, and the cost of the remainder of the items necessary to complete the project. This remainder is termed stadium equipment and conveniences. The following discussion covers the major items involved in this classification:

Public Toilets

Modern toilet facilities include as additions to the plumbing fixtures such accommodations as smoking and lounge rooms, public telephones, and the like. One authority estimates the following fixtures are required: for each one thousand men 1 toilet and 6 urinals, for each one thousand women 7 toilets. The buildings should be easily accessible to the seating decks and designed for light, ventilation and frequent cleaning.

Team Quarters

Team quarters are often referred to as field houses and are provided for home and visiting teams, preferably in different buildings. There should also be accommodations for field officials. Team rooms are furnished with 6 to 8 showers, 2 toilets and 4 urinals,



Kurt Grimm

STADIUM AT NUREMBURG
OTTO SCHWEIZER, ARCHITECT

together with rubbing tables, lockers, clothes-drying equipment, fans, etc. Most team quarters should be heated.

General Offices

General offices are provided when the operating management is housed at the stadium. It is desirable to locate these offices above or near the main entrance so that money from ticket sales can be safely taken to the cashiers through openings in the office floor or by means of pneumatic tubes.

Concession Accommodations

Catering to stadium crowds who consume enormous quantities of food and drink is very profitable. Concessionaires pay from 5 to 10 cents per admission for the privilege of exclusive handling of concessions. Thus a stadium handling an annual capacity of one million will receive from \$50,000 to \$100,000 in concession income. This amount often pays the annual interest charge on the entire stadium investment, and therefore justifies the expenditure of amounts required for cushion and refreshment booths and commissary quarters. It is desirable that all buildings and major equipment required for concessions be built and owned by the stadium authorities or owners. Thus the location and design of the booths and the commissary will fit in with the general design of the stands. It is advisable to consult concessionaires in this matter before proceeding with preparation of final plans. The commissary quarters are used for storage of goods, their preparation and distribution to salesmen, and include equip-

ment for bottled wares, peanut cabinets, tobacco humidor cabinets, refrigeration and toilets.

Miscellaneous Quarters

Quarters should be provided for the storage of athletic paraphernalia, paints, lime, cleaning equipment, etc. Space is also required for the grounds superintendent's office.

Press and Broadcasting Accommodations

Adequate press and broadcasting accommodations are equally as important as those for concessions. The modern stadium is a big amusement business which has been made possible by the intense public interest created and maintained by newspapers and radio broadcasting organizations.

At important games as many as five hundred writers and reporters from all parts of the country must be accommodated. A dozen or more represent news services and send their copy directly to their offices by means of telegraph instruments at their desks in the stadium press stands. A greater number use telephones which are furnished for their use in transmitting the progress of the game. The telegraph and telephone men should be allotted preferred space in the press stands. In addition to these two classes of press-stand occupants is a third class of individual writers who represent large newspapers. These take notes during the game or type-write their matter as the play progresses.

Facilities should be provided for the still photographers who represent the picture news services. There are also a number of crews of motion picture



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STADIUM AT NUREMBURG
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photographers, together with the sound crews. Finally space, preferably glass enclosed, should be allotted for broadcasters.

These quarters should be well isolated from the crowds but should afford a good view of all parts of the field. Where there is a grandstand roof, the press and broadcast facilities may be located at the inner perimeter as near as possible to the baseball 50-yard line or the home base in baseball games.

In designing these accommodations, it is advisable to consult with officials of sports writing associations, telegraph companies, telephone offices and broadcasting organization. Sound equipment is heavy and requires study as to the loads involved. The publicity men should be furnished with well heated and ventilated quarters, with toilets and drinking water.

Scoreboards

Scoreboards should be designed so that game information is visible from all parts of the seating area. Large electrically operated scoreboards may be leased or purchased from firms which specialized in this equipment. For small projects hand-operated boards are satisfactory. Game information is given on metal plates, suspended from hooks or revolved by hand pulleys.

Signs and Lettering

Easily read signs should indicate direction to portals, toilets, etc. While unnumbered seats, if continuous, will hold a greater number by packing, it is advisable from the standpoint of public comfort to number each seat. Numbers may be stenciled or burned into back rests, or stenciled on the risers if there are no backs. Metal numbers on back rests are uncomfortable.

Floodlighting

The usefulness and income of a stadium may be greatly increased by efficient floodlighting equipment. The lights should be designed and located for maximum light with minimum glare. The year 1930 was the first in which this feature of stadium operation was tried out on a large scale. Many stadiums have been equipped and the results are very promising.

A large stadium will require from 150 to 200 kilowatts to illuminate the field. Allowing 4 hours of night operation at 5 cents per k.w.h., this cost varies from \$30 to \$40 an evening. With illumination of stands and wear of lamps the total cost will probably range from \$50 to \$100 an evening.

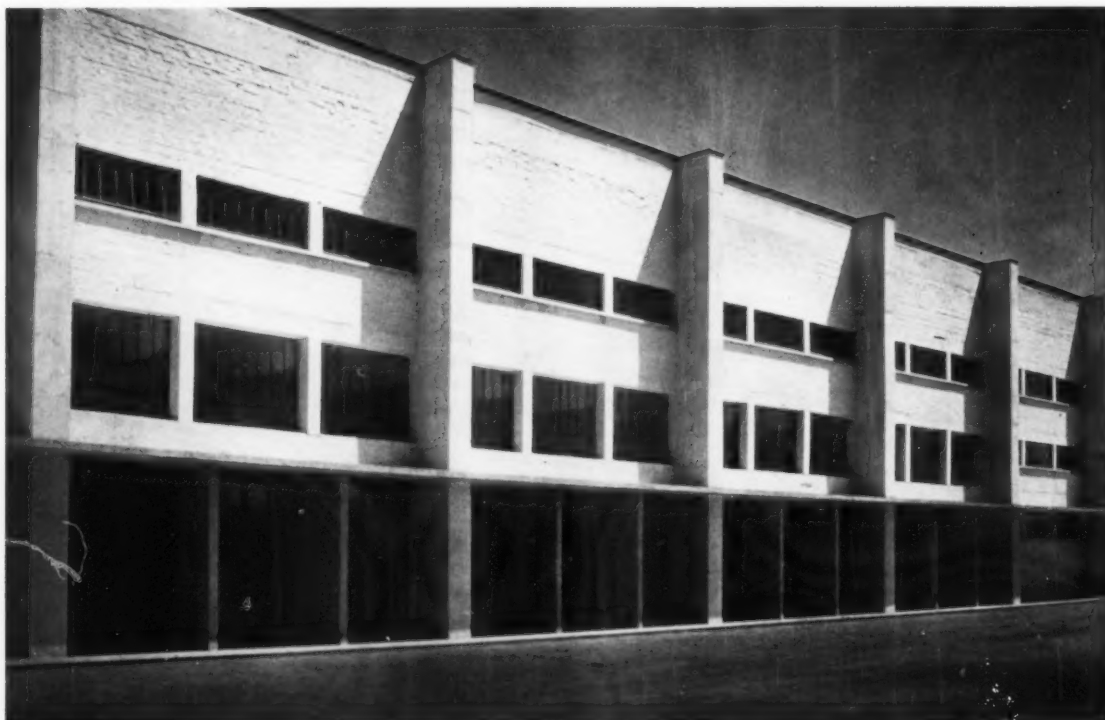
FENCES, GATES AND OTHER ELEMENTS

Since a charge is universally made for admission to stadiums, a high fence is a necessity where no enclosing walls exist. These fences may be of woven wire with barbed wire or cut wire tops if the stands cut off the view of the field from the outside. Otherwise solid fencing must be used. Most baseball clubs augment their income by selling advertising



Karl Grimm

STADIUM AT NUREMBERG
OTTO SCHWEIZER, ARCHITECT



Kurt Grimm



Kurt Grimm

STADIUM AT NUREMBURG
OTTO SCHWEIZER, ARCHITECT

space on the inside surface of 9- or 10-foot high fences which are lined inside with metal walls or plates. Masonry fences are expensive and funds ordinarily appropriated for this purpose might be better employed to provide more comfortable seating or greater capacity. Fences are also required for the separation of the various crowd classifications along the primary channels of distribution.

Although sliding gates or rolling shutters are commonly used, swinging gates are more economical and just as efficient.

Flagpoles. Flagpoles are used around the upper perimeter of the facade, at about 100-foot centers. They are often clustered at entrances. They are one form of expression of the gala atmosphere of outdoor attractions. In addition to these small poles of 10- to 20-foot heights the baseball club will require a large flagpole in center field 85 to 100 feet in height. This pole flies the pennant flag if and when it has been won by the home team.

Protection Nets for Baseball. To protect spectators from foul balls, netting of wire or well-tarred cotton thread is necessary. These nets shield the spectators in the vicinity of home base and extend from the inner perimeter of the seating area to the upper deck or roof above. The stands beyond the diamond may be protected by 8-foot high netting.

Turnstiles. Most concessionaires pay privilege fees based on the turnstile records of attendance. This count is greater than seat sales because of the free pass holders, press representatives and others. Non-recording or recording types, preferably the latter, are used.

Emergency Quarters. For handling accident cases among spectators there should be a private room well isolated from the primary channels of distribution under the stands and preferably in the general office building. It should be equipped with couches, stretchers, medical kits and other necessary items.

Taxi and Telephone. A place for the taxi starters should be provided at points which will not interfere with outgoing pedestrian traffic. Public telephones should be available in all parts of the stands and in public toilets.

Mechanical Trades. Hose connections are necessary for fighting fire and watering the playing field. Heat and hot water are required for the players' quarters and other rooms. As in all building work the mechanical design and specifications should be prepared by a competent mechanical engineer. The mechanical installation includes plumbing, heating, ventilating, electrical work, refrigeration, concession equipment, etc.

Playing Equipment. The furnishing of the various accessories required for football, baseball, track and other events is not included in the stadium building work. Such items are back stops, base bags and other portable items which are furnished by the stadium users or the operating management.



G. E. Illuminating Engineering Lab

WASHINGTON BASEBALL PARK
INDIANAPOLIS



Crause-Hinds Co.

FLOODLIGHTING A FOOTBALL FIELD
SYRACUSE, NEW YORK



Galloway

PRESS STAND AT YALE BOWL
NEW HAVEN, CONNECTICUT

CHECKING LIST OF STADIUM REQUIREMENTS

A. PRELIMINARY

1. *Surveys:* Aerial photos and topographical survey with complete data on water mains, sewers, gas lines, electric current, fire department requirements, streets, etc.
2. *Test borings and water table.*

B. PREPARING SITE

1. *Rough grading:* Balance cuts and fills. Locate top soil supply.
2. *Drainage:* Use 6" to 12" porous drain tile for playing field. Tee inlets with rubber caps around running field. Connect to 12" vitrified tile to catch basins. Pumps in catch basin. Connect catch basin to main street sewers. Grade play area to tee inlets and blind ditches.
3. *Fine grading:* Under grandstand, stands and enclosure structure use 6" layer of cinders. Cinder approaches and paths around perimeter of stadium. Seeded and sodded areas on playing field. Skinned surfaces at baseball diamond. Special cinders for running track. Pavement brick at main entrance approach of herring bone pattern.

C. GRANDSTAND, STANDS, ENCLOSURE STRUCTURES

1. *Piles:* Combination precast concrete and wood. Wood cutoff at 2 feet below minimum water line. Test to 20 tons safe.
2. *Pile caps:* Reinforced concrete; see local code. Use spread footings to maximum 36 square feet at 1,500 pound soil pressure.
3. *Structural steel:* Grandstand, stands, enclosure structure, roof, all lintels throughout, roofs of team and toilet buildings, ramp framing, floodlight towers, complete framing for administration building, and press and broadcast quarters on roof, framing for water tanks, etc. Live load throughout 100 pounds. Crowd sway 8½ pounds per square foot of seating area for lateral bracing. Battledock construction for main seating, treads protected with 1¼" thick asphalt concrete finish. Design and detail all exposed steel as trusses, columns, struts, etc., for neat architectural appearance.
4. *Miscellaneous concrete:* Concrete box section and front aisle. Concrete ramp slabs. Expansion joints on minimum 6-foot centers.
5. *Step locks:* Asphalt concrete fill in steel containers. Note steel containers in structural steelwork.
6. *Asphalt mastic:* ½-inch finish on approach to press and broadcast quarters on roof. Use over cinder concrete at all uncovered surfaces.

7. *Roof carpentry:* 4" x 6" rafters on steel purlins. Roofers 2" x 10" D. & M. S.L.Y.P. No. 1 grade.
8. *Roofing:* Five ply built-up asphalt except where asphalt mastic finish.
9. *Sheet metal:* 16 oz. copper for mansards and 20 oz. for skylights. Gutters, leader heads and leaders 16 oz. Eave strips and fascia at inside perimeter 16 oz.
10. *Painting:* Shop coat specification red lead. First field coat on exposed steelwork above deck including roof trusses to be selected unfading green shade approved lead and oil paint. Second coat field paint same except shorter in oil. Exposed structural steel at underside of deck construction and below to grade to be painted two field coats specification aluminum paint, except paint lower 6 feet of columns selected shades lead and oil paint two coats.
11. Note that accommodation requirements (G) intended to cover specifications on above, where affected.

D. SEATING FOR PERMANENT STANDS

1. *Box chairs:* Flat folding type steel frame and back, wood slats, order 1,500 per approved sample. These to be used for box section of main stands.
2. *Reserve seats:* Built-up steel brackets riveted to risers included in structural steelwork. Ironwork for backs in ornamental ironwork. Seat slats continuous 2' 2" x 6" and backs also wood as per detail. Flat iron armrests for individual seating. Capacity 10,542 at 19" seat allowance. Include wood finish and painting in general painting contract.
3. *Unreserved seats:* Same as reserved except arm rests about 6-foot centers. Capacity 14,164 at 19" seat allowance.

E. REMOVABLE SEATING

1. *Main bleachers:* Portable structural steel framing, stringers maximum 5-foot centers, seat boards 2" x 10" D4S, tread boards solid fill 2" x 10" D4S, No. 1 spruce painted to approved weatherproof specification. Tread width 25½" and riser heights from 7½" to 11". Capacity for football layout 32,450 and for boxing 35,910 at 18" seat allowance. Store under enclosure structure when not in use.
2. *Ramp bleachers:* Same as main bleachers except risers vary from 1½" to 3½". All treads 30" width. Seating built-up per details. Capacity for football layout 5,986 and for boxing 18,480 at 18" seat allowance. Store under enclosure structure when not in use.
3. *Ringside chairs:* Same as box chairs to rest on boards on ground. Capacity for boxing 2,180 to 19" seat allowance.

F. WALLS

1. *Exterior facade:* Exterior and interior faces of selected face brick. Thickness 13". Base of cut cast stone granite finish at entrances. Other base of concrete finish on poured concrete. Trim and band courses, coping, etc., of cut cast stone. Slate sills where shown. Statuary and ornamentation cut cast stone. Windows steel double-hung and casements as noted. Louvers as noted.
2. *Metal walls:* Interior facade of enclosure structure at perimeter of baseball outfield of 20-gauge copper bearing panels. Doors and gates 14-gauge ditto. Cut for baseball scoreboard as detailed.

G. ACCOMMODATIONS

1. *Team quarters:* One for visiting team under deck opposite third base; home team a similar building opposite first base. Each 24' x 42' x 10' (ceiling height), brick walls, cinder concrete roof slab on structural steel framing. Each building subdivided for manager, umpire, trainer, and players. Manager, 10' x 14'—1 shower, 1 lavatory, 1 watercloset, 2 lockers, 1 telephone. Umpire 9' x 10'—1 shower, 1 lavatory, 1 watercloset, 2 lockers. Trainer 10' x 18'—5 lavatory battery, 2 wash trays, 2 lockers, 1 rubbing table, medicine cabinet, etc. Note that players use lavatories in this room. Players 12' x 40' for 25 men—6 showers, 2 waterclosets, 1 urinal, 30 lockers, 2 benches. Further equipment for team quarters to include hot water from boiler room of administration building, steam heat, electric water coolers, (3) electric clothes dryers, electric lights and fans, and liquid soap dispensers and tank, toilet paper holders, mirrors, towel holders, towel baskets, etc. Mechanical ventilation for manager and umpire quarters.
 2. *Dugouts:* One each for visiting and home teams. Size 5' 6" x 35' for 22 players. Locate near team quarters under deck, no roof required. Equip with lights, fans, telephone, electric water cooler.
 3. *Public toilets:* Four toilets at grade under deck, two for men and two for women. Men's toilets 20' x 55' x 10' ceiling height divided longitudinally for unreserved and reserved spectators. Total fixtures for each of men's toilet buildings—42 urinals, 5 waterclosets, 6 lavatories, two slop sinks, mirrors and shelves, etc. Smoking rooms equipped with leather upholstered benches and public telephones in booths. Women's toilets 20' x 55' x 10' ceiling heights divided longitudinally similar to men's. Total fixtures for each building—15 waterclosets, 8 lavatories, two slop sinks, mirrors and shelves, etc. Rest rooms equipped with leather upholstered benches, medicine cabinets, telephone booths, emergency closets. Also rugs on floor, curtains and drapes, side wall mirrors, etc.
- Public toilets at promenade deck level (future). A pair of men's and women's respectively, at main entrance and three secondary entrances. Additional

future grade public toilets at three secondary entrances in pairs.

3. *Administration quarters:* Located at main entrance above main entrance lobby; for office work, treasurer, and executives. First floor has telephone room, taxi office and toilet, emergency room and toilet, and gas meter room. Second floor: president's office, women's toilet, men's toilet, and three additional executive. Note that pneumatic despatch tube system connects treasurer's office to ticket booths at main entrance one way system booth's to treasurer. Complete interior finish and mechanical equipment per list for administration quarters.

4. *Ticket booths:* Ten required at main entrance for 18 ticket sellers. Size 5' x 7' x 8' high open tops with wire mesh screens as shielded from weather. Connect these to treasurer's office with pneumatic despatch system, as above. Four required at each of three secondary entrances, for a total of 22 ticket booths and 36 ticket sellers at all four entrances. Provide 12 additional removable ticket booths for peak games.

5. *Press and broadcast quarters:* Locate on roof over cantilever behind catcher to pitcher line equal to football 50-yard line. Press quarters 20' x 66' x 16' ceiling height. Four tiers with 3' 3" treads and 2' 6" risers. 230 lin. ft. continuous desk for 115 reporters. Additional reporters (100) to be seated at sidearm writing chairs for peak games. Provide 115 folding chairs same as box chairs (see "Dr") and store under press seating deck.

Broadcast quarters one at each end of press quarters. Size 10' 6" x 9' 6" x 10' 6" ceiling height. All soundproof walls. News reel quarters one at each end of broadcast quarters 9' x 21' x 10' 6" ceiling height. All soundproof walls. Still photo quarters one at each end of news reel quarters 5' x 42' x 10' 6" ceiling height.

Note all above quarters to be glazed on field side with 1/4" plate glass. Lights, steam heat, toilets, fans, electric water coolers, telephones, telegraph outlets, smoking room, etc. Note elevator service for these quarters with shaft at main entrance and emergency stairs to main deck below. Note heavy news reel equipment for sound to be located at columns only.

6. *Concession commissary:* Locate under main deck at grade near main entrance 50' x 100' x 16' ceiling height varying with deck above. Tanks for bottled drinks, humidors for tobacco, peanuts, etc. Cooking equipment for frankfurters, ice cream cabinets, etc. Lay out all equipment in co-operation with concessionaire.

7. *Concession booths:* Required for cushions and refreshments. Locations to be at grade and on promenade deck. Co-operate fully with concessionaire.

8. *Parking decks:* Of battledock construction with non-skid asphalt finish 1/2" thick. Accommodations for 1,200 cars allowing 100 square feet per car.

Ramps as detailed to slope 1:5, cinder concrete slabs rough cement finish.

9. *Parked spectators:* Reserve 25' width at promenade for cars in addition to 10' width for seated spectators giving a total of 35' of promenade width with separation curbing. Ramps to parking decks to be continued to promenade deck for these cars. Park all cars oblique at plainly marked space reservations.

10. *Storage space:* This space includes quarters for grounds superintendent and his force. Also for storage of turnstiles, paints, bleachers, protection nets, flags, backstops, goal posts, etc. Locate incinerator, paper bailers, refuse containers, etc. Locate skinned area mat scrapers, bases, canvas covers for field, lawn mowers, hose, wheelbarrows, etc. Provide toilets for force.

11. *Boiler room:* Located in basement of administration quarters, size 32' x 12' (main floor to ceiling). Equipment: main boiler, 940 gallon hot-water tank, summer hot-water boiler, fire pump, two house pumps, pneumatic system air pump, vacuum pump, sump pump, etc. 2,500 gallon oil storage tank located 2 feet away from foundation walls outside of boiler room.

12. *Electric service room:* Located in storage space at grade near main entrance. Fireproof throughout; concrete slab roof, fire door, main distribution switch board, lighting service entrance, switch, lighting transformer cabinet, power service entrance switch, and cut-out box.

13. *Transformer vault:* Adjacent to electric service room, same construction and door. Housing for public service transformers.

H. PIPE RAILING AND ORNAMENTAL IRONWORK

1. *Railing at outer edge of promenade* on facade to be 4' high built-up W. I. railing with pipe handrail and standards for facade lighting. See details. Railings at ends of stands to be 1 3/4" diam. 4' high double with No. 8 gauge crimped wire mesh channel frames. Railings at front of box section same as above 3' high.

2. *Separation railings:* For box section 1 1/4" diam. 3' 4" high, single, no mesh.

3. *Deck railings around vomitories:* 1 3/4" diam. 3' 4" high double with mesh as above.

4. *Ramp railings:* 1 3/4" diam. 3' 4" high, double, no mesh.

5. *Railings at ticket booths at grade:* 1 3/4" diam. 3' 4" high double, no mesh.

Note: All railings to be weld-connected.

6. *Mesh enclosure:* Fill in all arches at ramps with wire mesh, metal frames, similar to fence construction.

4. *Scoreboards:* Baseball scoreboard to be laid out on

metal sidewalls (See F 2) 25° off centerline in left field. Overall size 31' high by 38' length, lower edge 15' above field grade. Strikes, balls, and outs to be indicated by 24" high numerals No. 12 gauge plates vertical slide counterweighted and pulley operated manually. Inning information and batters 24" high numerals on plates suspended from inside hooks. Information on games between other teams in same league to include scores by innings indicated by 24" high numerals. All lettering and figures white on black backgrounds. Provide overhead illumination for scoreboard use at night. Scoreboards for football to be located in duplicate, one at rear tower of north secondary entrance and one at rear tower of south secondary entrance. Both to be approved patented movable football scoreboards, about 20' x 30' length, with 24" numerals and 24" movable football symbol. Lower edge of boards to be 10' above promenade deck level. These boards to be installed only for football season and removed after final game.

5. *Signs and lettering:* All the lettering and small sign work for doors, halls, team and toilet buildings, ramps, exits, entrance block and secondary gates, bleacher and stand ramps, and all individual numbers for seating in permanent stands and press and broadcast quarters on roof.

6. *Turnstiles:* Provide 31 registering turnstiles at main entrance and secondary gates. To be equal to sample. To be equipped with air shock absorbers that check arms each quarter turn making it unnecessary to release foot lever or make any special mechanical movement so that the arms can be turned. Must be designed to be put under control of gate keeper when required, who, by simply pressing down a foot lever, can stop the turnstile arms at any point. Arms to be broad aluminum protective. Furnish 5,000 record slips.

K. PLUMBING

Include: Cold water system, drainage system, fire line system, gas system, hot water system, house sewers, house pumps, all plumbing, all plumbing fixtures throughout the entire stadium, private sewer, roof tank water supply, soil, waste and vent piping, etc.

L. HEATING AND VENTILATING

Include: All steam heat for accommodation quarters noted, all ventilating indicated, etc.

M. ELECTRICAL

Include: Bell system, lighting for accommodations, lighting exterior facade of stadium, field floodlighting, and all required cables and wiring from transformer vault to fixtures, motors, etc. Provide all conduits required. Provide all lamps and fixtures noted.

OFFICE PROCEDURE, I.

By PARKER MORSE HOOPER

The second quarter of the twentieth century is witnessing not only a complete change in architectural design but also a gradual change from architecture as a profession to architecture as a business. Today, more than ever before, it is essential that an architect's office should be run in the most efficient economical manner. Too many architects have failed to realize that the success of their work depends as much upon the efficient manner in which it is handled as upon its artistic and architectural merit. Although a client may be satisfied and pleased with his building when it is finished, if he has suffered from the annoyance of delays, unforeseen extras and mismanagement of the job, he is not likely either to recommend his architect to his friends or to give him another job to do. We all know so many good architects who are not good business men, but can they be called good architects when their only virtue lies in the fact that they are clever and artistic designers? The conservative architect of the past generation looks with alarm upon the commercialization of his profession but if he wants to keep in the race and stay on the band wagon it is absolutely essential that he should reorganize his office into an efficient, well-run business.

The office of John Russell Pope has the enviable reputation of being one of the most efficiently run architectural offices in this country. After the expenditure of great thought and care based upon thirty years of experience this firm has compiled an Office Manual with which every member of the office must be thoroughly familiar. Upon this Manual the office procedure of this firm is based. The introduction to this Office Manual shows the important factors in the preliminary work on any job. Following these introductory pages is a diagrammatic layout of the manner in which the work of this firm is handled. Under the title Office Routine and Procedure follows a complete description of the several departments of the firm and the manner in which different parts of a job are delegated to them.

OFFICE MANUAL OF JOHN RUSSELL POPE, ARCHITECT ROUTINE AND PROCEDURE

The purpose of this manual is to supply and provide information and help to new employees entering this organization, and to present members desiring information in regard to procedure. It is not intended as a document of rigid law but more as an elastic guide to office procedure, and is subject to revision from time to time.

PRELIMINARY WORK

In the inauguration of a job the client should be furnished with our standard questionnaire covering space requirements, site conditions, heating, ventilating and electric systems, etc., and this questionnaire should be followed up by the office contact man to secure as much definite information as is possible in the early stages of the work. A preliminary sketch layout of the design in plan and elevation shall be made for the purpose of securing a prelimi-

nary cube and this shall be submitted to the client in a tabulated form similar to the attached sample used on the Blank residence. A member of the administrative section, the general superintendent of construction and the chief draftsman should be called into one preliminary conference with the client to determine the general set-up regarding type of construction and basic materials. Dates for completing preliminary drawings should likewise be definitely determined. Preliminary cubage should be prepared in accordance with standard A.I.A. methods and issued to the client only after being recorded in the usual office bulletin. Secure a definite set-up of cash allowances, including special items such as sculpture, models, mural decoration, hardware, lighting fixtures, outside electric, water, and sewage disposal work, special heating and ventilating, special waterproofing against ground water

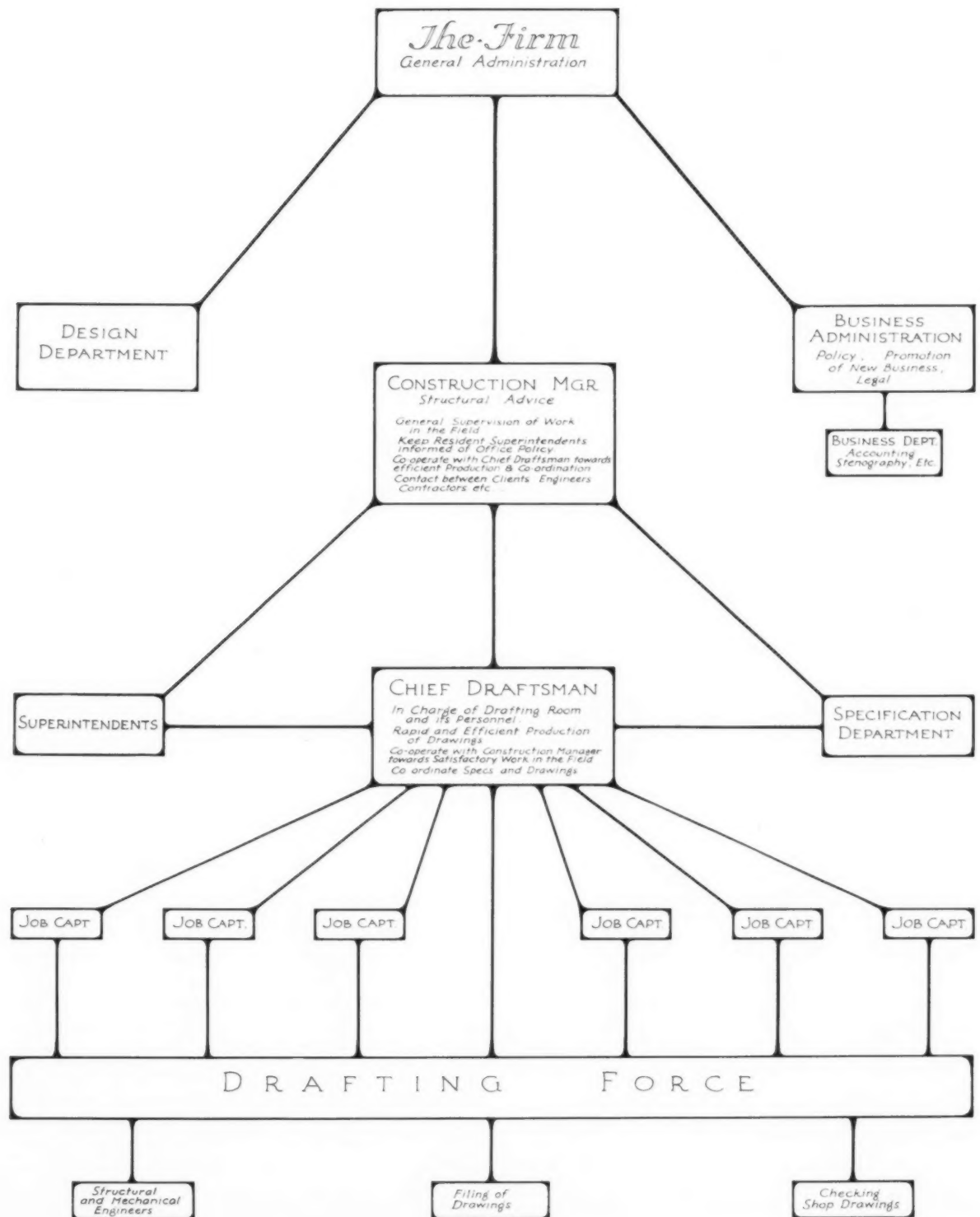


CHART OF OFFICE ROUTINE AND PROCEDURE

condition, engineer's fees, special bronze work, and in the case of residences special finish rooms. Final cubes should follow the same line of procedure.

CONFERENCES

All matters occurring in conferences should be noted and should appear at the earliest possible moment in the form of a typed report. Telephone conversations are to be considered as conferences and typed records included in the job history. At important meetings of building committees on public or semi-public buildings stenographic minutes should be kept of each meeting.

ESTIMATES

Preliminary estimates should be secured and submitted to the owner before proceeding with final working drawings. On securing this information the office is then ready, after a consultation with the chief draftsman, to set a definite date for the completion of working drawings.

FACTORS ESSENTIAL TO SATISFACTORY WORK

Time is a most important factor in all building operations. At no stage of the work should the architect procrastinate in the matter of securing decisions and expediting the progress of the drawings. The contractor is always most willing to place the blame for delay in construction work upon the office of the architect. Responsibility for progress in field construction must always remain with the contractor.

JOB CAPTAIN

In general it will be the responsibility of the job captain to handle the production of the working drawings and details with economy and with no unnecessary loss of time. Both in regard to plan arrangement and aesthetic design he should coach his men not to accept the first solution but to set up one or two alternates and quickly come to a decision in regard to the most acceptable scheme. In residence work, in particular, it is desirable to determine the elements affecting exterior treatment of the building well in advance of the development of details, in order that continual changing of the plans as the work nears completion may be dispensed with. Any overhang of upper stories over the lower should be established definitely by detail, and cornice treatment both at eaves and gable rake should be determined with sufficient accuracy to layout intersection of roof lines.

Decisions required from those higher in authority affecting design should be secured without delay. And where delays of more than ordinary duration occur, they should be made a matter of record in order that a strict accounting of the time expended on any job may be properly made at any stage of the work. Upon the letting of the contract the job

captain should secure a schedule of dates upon which various detail drawings will be required for the successful prosecution of the work. He shall at all times keep a check upon the actual progress of the schedule.

MODELS

Models are frequently the cause of delay. Drawings required for models should be among the first details to be produced and should be placed in the modelers' hands at the earliest possible moment via the general contractor. The general contractor should thereafter assume responsibility for expediting the work of the modeling, and the specifications should always make it clear that such is to be the case.

SPECIFICATIONS

The specifications should always be drawn in close co-ordination with the design department. Particular attention should be paid to securing from the client, as far as possible, definite decisions regarding all matters affecting interior finish, extent of antiquing, glazing, etc. Items such as decorative painting, sculpture, wrought iron and bronze work should be put in the form of cash allowances rather than specified outright. On monumental work the line should be carefully drawn as to ornament desired to be carved by a selected stone cutter. Cash allowances must be very complete and in accord with both the client's and the designer's understanding. On large work, cost of five tons of extra steel shall be added to the cash allowance set up, and another five tons shall be called for as contingency allowance in the steel specification. Make a cash allowance for extra steel in residence work.

ADMINISTRATIVE SECTION

The Administrative Section consists of three members of the firm. All work of an administrative nature, interviewing clients, general business, administration and general design will be decided upon or executed by the administratives. All work of a financial nature, selection of lists of bidders, opening of bids, etc., will be done by this section. Inquiries arising in other architects' offices as to this office's approval of materials, contractors or subcontractors will be answered by this section. Orders for extra work and work omitted shall be signed by the Administrative Section.

OFFICE

CLERICAL SECTION

BOOKKEEPING—The Clerical Section includes the bookkeeping and stenographic departments, letter and contract filing, and telephone switchboard. The bookkeeping department keeps the records of all money transactions between the owners and this

office, between the owners and contractors, makes tabulation sheets of bid comparisons, sends out all bills for service, bills to the contractors for additional blueprints and specifications and makes up the office pay roll.

STENOGRAPHIC—The stenographic department writes all letters, reports and specifications. Of all letters at least three carbon copies shall be made. Of all reports of conferences within the office at least six copies shall be made. Of all reports of conferences held outside the office and all inspections six carbon copies shall be made. These various carbon copies are made on different colored tissue for various distribution.

LETTER AND CONTRACT FILING—The filing department has charge of all letters and contracts, the recording of all incoming and outgoing blueprints, specifications, samples, etc. Only the file clerk shall have access to the files.

All blueprints and specifications sent to contractors shall be accompanied by a receipt which the contractor shall sign and return. The receipts are in duplicate, one white and one yellow. The white copy is sent out and the yellow copy remains in the receipt book. When the white copies are returned they are to be pasted over the corresponding receipt. The yellow copy of all correspondence, after being initialed by persons concerned, shall be filed. The yellow tissue copy of all letters, reports and inspections shall not be removed from the filing department but is to be kept for ready reference. When a job is approximately done, letters shall be retired to transfer cases in the stock-room. All contracts and all comparison of bid sheets shall be filed separate from the letters.

INCOMING MAIL AND TELEGRAMS—All incoming mail and telegrams, except bids and personal mail, shall be opened by this section and stamped as to date and time. Where blueprints are included with a letter, the blueprint must not be detached from the letter, but the original letter and the blueprint shall immediately be sent to the Chief Draftsman. Where blueprints are received without a letter, they shall be immediately sent to the Chief Draftsman.

OUTGOING MAIL AND TELEGRAMS—The copies of all outgoing mail shall be distributed as follows: Copies of all letters shall be sent to the field sections, and one copy shall be given to the General Superintendent of Construction. The yellow copy of all letters shall be sent to the Chief Draftsman for initialing. All telegrams shall be handled the same as letters, except that a confirmation shall be sent by mail.

REPORTS—Reports of conferences and inspection shall be distributed to all needing the information.

CONTRACTS—This section shall receive preliminary and final estimates and shall tabulate them, taking particular care of a matter of additions

or deductions of alternate bids, addenda or supplements, unit prices and the inclusion of all cash allowances. Where a contractor has neglected to give such alternates or unit prices, this section shall, whenever there is time, obtain them. Prior to the signing of the contract between the Owner and the Contractor the Contract shall be checked by the Chief Draftsman, General Superintendent of Construction and Specification Writer. This section shall file all Contract Documents.

FORM LETTERS—Printed form letters shall be used with supplements to the Owners, approval of subcontractors, to the General Contractor, and extra and credit forms to both the Owner and the General Contractor.

TELEPHONE—When the office telephone operator receives a call and cannot locate the person called, she shall make out the proper form and immediately place it on the person's desk. All long distance calls shall be recorded according to form supplied for the purpose.

DRAFTING ROOM

CLERICAL SECTION

This section takes care of the filing of all drawings and shop drawings, and card record of same; giving out numbers for sketches, drawings, addenda and supplements; ordering of and giving out all drafting room supplies; ordering of all blueprints and photostats; doing all mailing, deliveries and errands; and issuing and collecting time cards.

BLUEPRINTS AND SPECIFICATIONS—Where issuing blueprints to Contractors estimating on a building, one set of blueprints of all drawings and one set of mimeographed specifications shall be sent to each firm of General Contractors on the list of bidders without cost to them. Any additional sets of blueprints shall be sent from the blueprinter's direct, either C. O. D. or, where out of New York, by parcel post C. O. D. Where a General Contractor wishes additional parts of a specification, blueprint copies of the bond paper set shall be sent the same as drawings. Where a Contractor wishes complete additional specifications, mimeographed sets shall be sent him and the bookkeeping department so notified for billing.

Where issuing blueprints of scale drawings or details to a firm that has obtained a contract, four prints of each drawing shall be made, three sent to the General Contractor and one to the Architect's Field Superintendent. Three sets of specifications shall also be sent to the Contractor and one set of specifications shall be sent to the Field Superintendent. Any additional blueprints requested by the Contractor shall be sent from the blueprinter's Direct C. O. D.

All supplements to drawings and specifications and all addenda to specifications shall be issued

same as other drawings and specifications, except that a copy of all change supplements shall be sent to the Owner.

It shall be the duty of this department to see that all drawings, supplements and addenda have been initialed by the Chief Draftsman prior to sending for blueprints.

Where a drawing is revised instead of a small supplementary change the drawing shall be reprinted and issued to the General Contractor and Architect's Field Superintendent the same as a new drawing.

The blueprint orders shall be made out by this section *only*. A transmittal form shall accompany all drawings or specifications.

DRAWING FILES—The draftsmen will have access to all drafting room drawing files, but where certain drawings cannot be readily found this department shall obtain them as required. When the draftsmen have finished with drawings, they will put them back in the tops of the drawers. This Section shall assign one member to file all such drawings in their respective folders the first thing each morning.

SHOP DRAWINGS—Where shop drawings are given to this Section by the Job Captains, this Section shall see that same is either approved or disapproved and so stamped. One copy shall be stamped "Office Copy" and filed by this department and the remaining copies mailed to the General Contractor. A transmittal form shall accompany all shop drawings, noting on same the status of drawings at time of transmission; i.e., "Approved as Noted", "Disapproved", etc.

TRANSMITTALS AND MEMO ORDERS—All transmittal forms shall be made out by the Job Captains. The white copy is to accompany the material sent, the yellow copy is to be given to the Chief Draftsman, who, after checking same, will send it to the Job Captain. The Job Captain will keep same arranged as to date sequence till the completion of the job and then give it to the Clerical Section for filing with the letters. Memo Orders for all outgoing blueprints, specifications, samples, etc., will be made out by this section and sent to the Clerical Section for recording; after recording they shall be destroyed.

ORDER RECORDS—Order records shall be made out for all orders for supplies. The white copy being sent to the vendor, the yellow copy being kept by this Section.

CATALOGUE FILE—The catalogue files in the Specification Section shall be kept in order by this Section. All incoming catalogues shall be submitted to the Specification Writer before filing. One copy of each catalogue shall be properly filed unless the Specification Writer directs that certain products shall have additional copies for use of the Drafting Room.

DRAWING NUMBERS—This section shall keep a card index of all drawings, using white cards for

sketches and working drawings, red cards for interior drawings and structural steel, green cards for exterior details and mechanical drawings, and yellow cards for full size details. All sketches shall be numbered from 1 to 99, Plot Plan 100, Working drawings $\frac{1}{8}$ " and $\frac{1}{4}$ " scale 101 to 300, Interior drawings, large scale 301 to 400, Exterior drawings, large scale 401 to 500, Mechanical drawings, Structural Steel 601 to 700, Full size details 1001. Supplements shall be numbered from 1. Draftsmen shall apply for the proper number.

SUPPLY ROOM—This section shall keep the supply room properly stocked with required materials for all sections. When the office is closed for the night the supply room must be locked.

Letter transfer cases shall be removed to the storage warehouse when the job is entirely done.

MAILING AND DELIVERIES—This section shall collect all mail at the end of each day and deliver it to the 45th Street Post Office. All parcel deliveries, collections and errands shall be made by this section.

DRAFTING SECTION

Each job shall be assigned to one of the Job Captains, who will be responsible for the completeness and correctness of all drawings and supplements. As a guide to the sequence of the work, attention is called to the Drafting and Specification Procedure Chart of this manual.

DRAWINGS—Drawings, except the contract set, are not to be made on a standard size sheet, but the sheets shall be of such size as will allow for proper detailing without cramping and without being wasteful when blueprinting. Contract set is to be on equal size drawings determined at the start of the job. In order that accurate record of progress be kept, the Job Captain shall plot the approximate number of sheets required and assign titles and obtain numbers as rapidly as any portion of the work is incorporated on a sheet.

In order that drawings may be kept uniform in appearance, standard indications shall be in accordance with the following charts of this pamphlet. Standard type of lettering; standard indication of materials; standard indication of door and window opening; standard indication of plumbing fixtures; standard method of dimensioning; standard method of abbreviation.

For titles use a rubber stamp and place in lower right hand corner only.

On all drawings for alteration to buildings, additions to old buildings, where new buildings are attached to old buildings, or where new panelling is placed in a room, place the large stamp "All Measurements to be Verified at the Building" just above the title stamp.

CHECKING—While drawings are being prepared, they must be checked with the checking list in this

pamphlet and all necessary items included. Prior to issuing to the contractors for bid the drawings shall be checked with the specifications, conference notes, surveys, and with mechanical plans for sump pits, floor drains, pump, machine and boiler foundations, pipe trenches, etc. Check all dimensions.

Two weeks before date of submission of drawings to bidders, structural and mechanical engineers shall be notified to proceed with final check and also check engineering requirements for reinforced concrete slabs on earth against water pressure. At the same time the structural and mechanical engineers start their final check the General Superintendent of the Field Section shall check the general construction. The Schedules shall be prepared by the Job Captain and Specification Writer and exterior and interior finish referred to the Designer for his approval.

Before issuing drawings to bidders, the Job Captain shall make a final check of the Schedule of Finishes, door schedule and window schedule.

ADDENDA AND SUPPLEMENTS—After the drawings and specifications are out for bid and before the contract is let, any additional specification information sent out is to be stenciled, mimeographed and termed "addenda." After the contract is let, any changes or additional information sent out is to be called a "supplement." Supplements to either drawings or specifications shall be made upon the standard supplement sheets. All addenda and supplements shall be numbered and dated and drawing number or specification page and paragraph numbers mentioned where change occurs. All supplements are to be marked for "Information" or for "Changes." Supplements shall be used for minor changes. When changes are extensive the old sheet shall be stamped "Superseded." Where addenda or supplements are issued, the drawing affected shall have the addenda or supplement stamp placed on the original drawing near the location affected. After the original set of scale drawings are sent out for bid, they shall *not* be changed, revised or corrected. Drawings are contract documents.

DRAWING, ADDENDA AND SUPPLEMENT NUMBERS—Each drawing, addendum or supplement shall have a number. The draftsmen shall apply to the drafting room clerks for such numbers and shall not assume such numbers themselves.

ISSUING DRAWINGS, ADDENDA AND SUPPLEMENTS—Before any drawings, addenda or

supplements are to be blueprinted, the first time, the Job Captain shall ask the Chief Draftsman to inspect same and initial as checked. The Job Captain will give all drawings to the drafting room clerks for blueprinting and give them the required information as to number and to whom sent.

Change supplements are issued to secure estimates.

Drawing revisions or instructions to the field should not be made on the basis of a supplement until estimate has been received, and extra order is signed by Owner. Use form letter for transmission of Supplements to Owner. In case of extreme emergency requiring extra work the order should be put through to the Owner immediately on a cost-plus, unit price, or such basis as is agreed upon.

DRAWING FILES—The draftsmen will have access to the drawing files. Where it is not possible to readily find a drawing, notify the drafting room clerks. When returning drawings, lay same on the drawers on top of the drawing folders and the clerks will place them in the correct location.

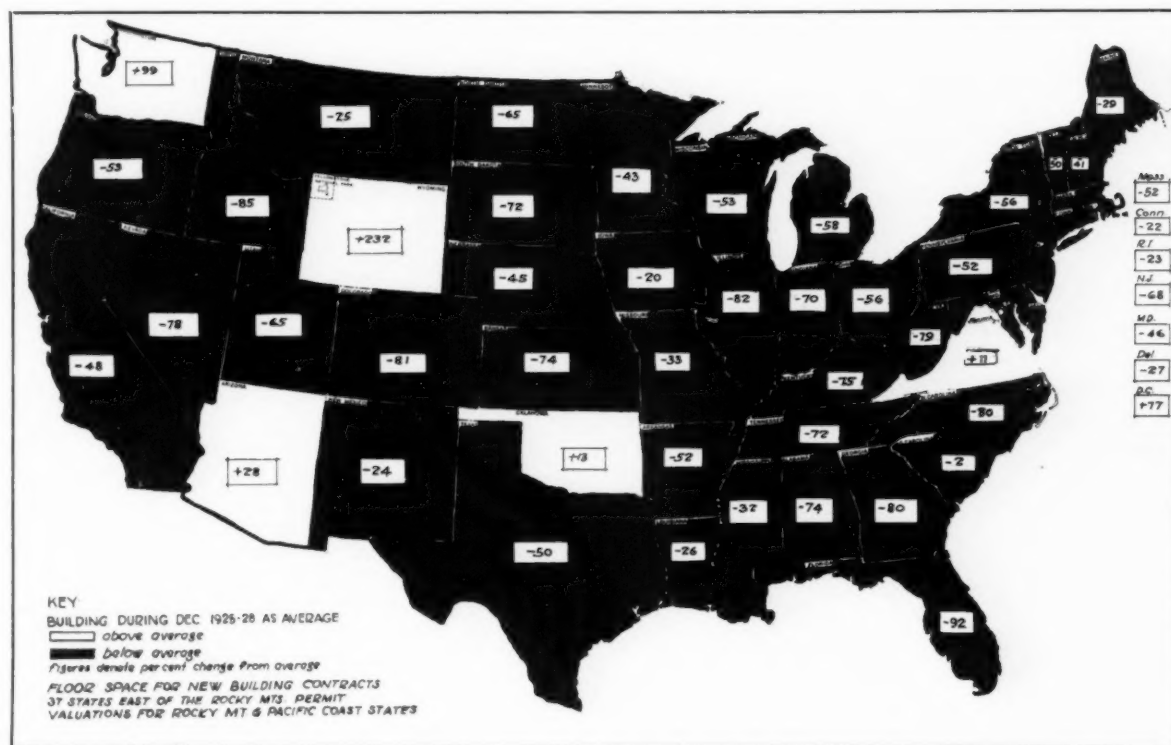
When necessary to have an old shop drawing or to file a new one, the clerks will obtain them or file them.

SHOP DRAWINGS—Shop drawings shall be checked and stamped, with "Resubmit" stamp, "Approved As Noted" stamp, or "Approved" stamp. One copy will be filed, other copies returned with letter of transmittal. Place on all shop drawings the large stamp "All Measurements to be Verified at Building."

CORRESPONDENCE AND TRANSMITTAL—The Job Captain and Field Superintendent are required to handle the larger portion of correspondence relative to their respective responsibility in a job. Do not dictate letters in the front office, phone the Office Clerical Section to ask for a stenographer. Use stenographer in place of long hand wherever possible. Where transmittals are used for the routine work of sending blueprints, or samples, they shall be made out by the Job Captain and given to the drafting room clerks.

The Job Captain shall keep a folder of all transmittals of drawings, all reports of conferences and copies of all letters pertaining to the development of the working drawings and details. Copies of all reports of conferences within and without the office will be given the Job Captain and Field Superintendent relative to their work, and they shall initial all correspondence affecting the job.

(The second half of this office manual will appear in the March issue. It will contain such features as "Hints for Draftsmen" and a "Checking List of Design Requirements.")



The December building map showed no appreciable change from conditions reported for the preceding month. Only six states reported larger volumes than average (December 1925-1928); of these only one, Washington, showed a gain in November over average.

BUILDING TRENDS AND OUTLOOK

PROSPECTS FOR RESIDENTIAL BUILDING

Residential building is the only branch of the construction industry that shows any promise of improvement during 1931. Even here whatever gain materializes will be only moderate since some further readjustment appears necessary in the light of abnormal vacancy conditions still existing in many localities, particularly in the high rental brackets in apartment houses and one- and two-family dwellings. There are doubtless many cases where families and individuals have doubled up—an occurrence genuinely characteristic of periods of general business depression. This condition has accentuated the causes and further aggravated the otherwise bad effects of protracted business debility.

That families forced by economic considerations to double up will take up abodes commensurate with their normal living standards when conditions permit is a foregone conclusion. Meanwhile, surplus space has been augmented materially, making more difficult the revival. The situation in

lofts and offices is pretty much the same; occupants of manufacturing lofts have doubled up while desk space arrangements have been on the increase.

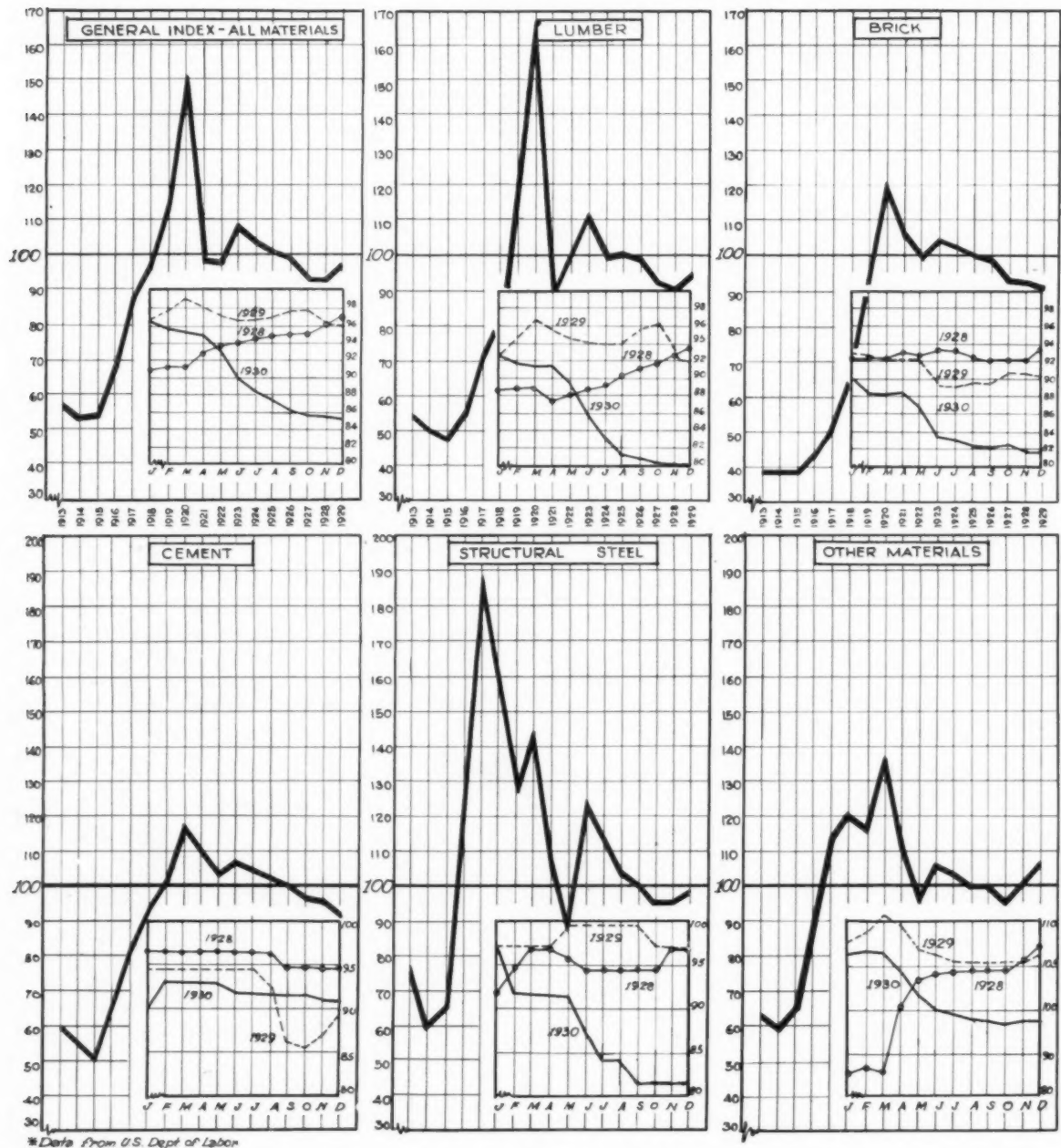
Thus surplus space, beyond what is normal, will have to be absorbed or otherwise worked off before any genuine recovery in residential building, or for that matter in general building, may be witnessed. The current year will be one of further readjustment which should be largely completed by 1932.

The readjustment began in 1929 with a sizable contraction in new residential building. It now appears that this decline which preceded the decrease in the volume of general business was somewhat delayed by the easy money conditions that prevailed. Under these conditions the large building activity of the period from 1925 through 1929 had anticipated the requirements too far in advance. Even a 30 per cent decline from 1928 in residential building was not sufficient to deflate the conditions;

(Continued on page 92, advertising section)

WHOLESALE PRICES FOR BUILDING MATERIALS

1926 Monthly Average = 100



The general index of building material prices, compiled by the U. S. Department of Labor, receded further in December. The decrease from December 1929 was slightly more than 12 per cent, while the decline from the 1926 average was about 16 per cent. The purchasing power of the building material dollar in December, as compared with the 1926 average, was about \$1.19. For the seven-year period from the beginning of 1913 to the beginning of 1920 the general index of building material prices was substantially lower than the general index of commodity prices at wholesale. At the present time, although there has been a very drastic decline in new building volume, building material prices are still above the average wholesale level. If building volume does not show any improvement it is not unlikely that the index of materials will ultimately work lower; at least some further price readjustments between materials and the general index seem presaged.

JUSTICE ADMINISTERED

... in Rooms of Lasting Beauty



Interiors at Erie County Court House retain their fresh, clean beauty through long arduous service

PEOPLE pass in and out constantly; dust drifts in through open doors and windows. Corridors and rooms are crowded; careless hands leave finger prints, smudges. It's no easy matter to keep walls and ceilings in a public building always clean... light... handsome.

At beautiful Erie County Court House... as at hundreds of other fine modern buildings... the task is made decidedly easier by the use of Barreled Sunlight.

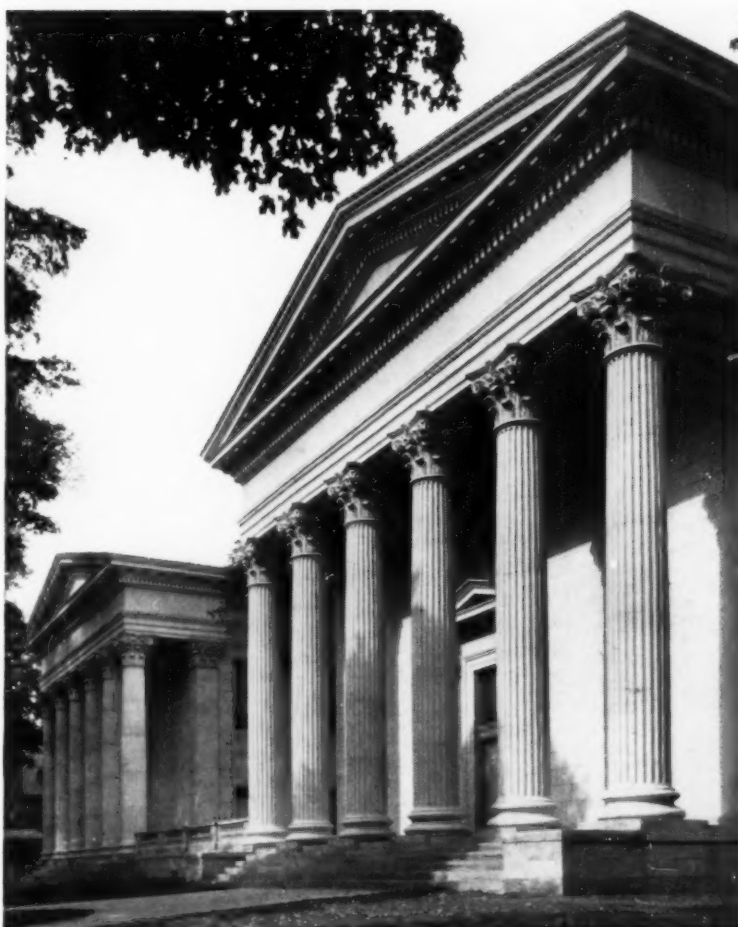
★ ★ ★
Flawlessly smooth, Barreled Sunlight can't hold dirt embedded. A moist cloth takes it right off. Washable as tile. Upkeep is economical.

Extremely durable, Barreled Sunlight successfully withstands repeated washings... retains its fresh clean beauty through long arduous service.

Whether in long-lasting white, or soft, pleasing tints, Barreled Sunlight is conspicuously good-looking, with a pronounced lustre, a rich depth. An all-oil product, it is readily tinted any desired shade with ordinary colors in oil.

You will find our catalog in Sweets; but we should like to send you, for your own files, the new booklet, "For Interiors of Lasting Beauty and Cleanliness." Write for it.

U. S. Gutta Percha Paint Co., 22-B Dudley St., Providence, R. I. Branches or distributors in all principal cities. (For Pacific Coast, W. P. Fuller & Co.)



The distinguished exterior of the new Erie County Court House, at Erie, Pa., is fittingly complemented by handsome interiors in white, and soft agreeable tints. The architect, Mr. W. T. Monahan, specified Barreled Sunlight, of which five hundred and fifty gallons were used.

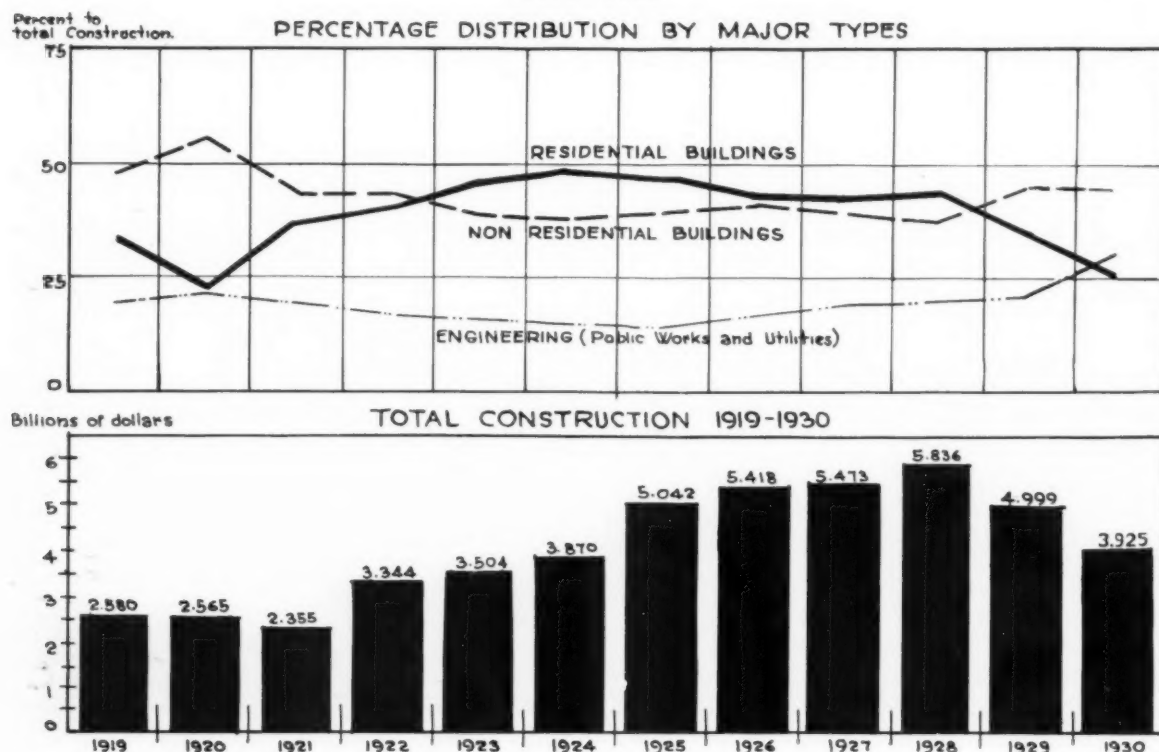
Barreled Sunlight is now available in two forms, Interior and Outside. Write for complete information on Outside Barreled Sunlight—its more pronounced whiteness, richer lustre and marked durability.



Barreled Sunlight

Reg. U. S. Pat. Off.

CONSTRUCTION CONTRACTS AWARDED IN 27 NORTHEASTERN STATES 1919-1930



Normally residential building represents approximately 40 per cent of all new construction. From this viewpoint it seems rather clearly indicated that residential building in 1931 will not attain its normal position of primary importance which will doubtless be deferred to 1932 or thereafter. For each of the years from 1922 to 1928, inclusive, residential building accounted for 40 per cent or more of the total new construction volume, having reached its maximum relative importance in 1924 when the ratio to total was 48 per cent and its maximum actual dollar total in 1928 when the ratio to total had dropped to 44 per cent.

(Continued from page 183, editorial section)

the additional decline in 1930, which amounted to 42 per cent from 1929, probably very largely accomplished this necessary end. Thus the year which has just closed showed a residential volume 60 per cent below the peak registered in 1928; in point of value one must go back to 1921 to find a total volume of new residential building lower than that which was registered for 1930.

Relative to total construction, residential building for 1930 was somewhat better than in 1920 when the volume of new construction was considerably lower than that registered in the year just closed. In 1930 residential building accounted for about 25 per cent of the value of all new construction undertaken, while in 1920 residential building represented only 22 per cent of total construction volume. That 1930 as a whole showed a higher ratio for residential building than was registered in 1920 is an encouraging sign since at midyear the 1930 ratio was only 22 per cent. This fact gives further proof to the opinion that 1931 will be a year of further readjustment between the major categories

of construction with residential building showing a higher percentage of the total construction volume which, in value, will likely be not far different from that for 1930. Thus the current year will possibly show new residential building at from 30 to 35 per cent of all construction and in this respect should not be unlike the year 1921 when the aggregate value of all construction was considerably lower than the indicated total for 1931.

Normally residential building represents approximately 40 per cent of all construction. From this standpoint it seems rather clearly indicated that residential building in 1931 will not attain its normal position of primary importance which will doubtless be deferred to 1932 or thereafter.

For each of the years from 1922 to 1928, inclusive, residential building accounted for 40 per cent or more of the total new construction volume, reaching its maximum relative importance in 1924 when the ratio to total was 48 per cent and its maximum actual dollar total in 1928 when the ratio to total had dropped to 44 per cent. Thus there were seven

(Continued on page 94, advertising section)

Have you noted . . .

the 3-inch per foot sill slope
slope . . . on this new frame?

*A new Andersen Feature
that stops water leakage*

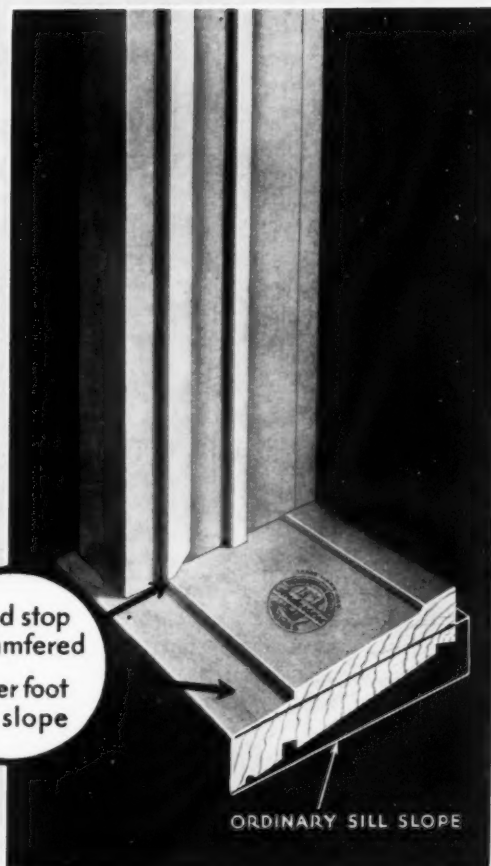
ON the recommendation of architects, Andersen now has a 3" per foot sill slope on the new Andersen Master Frame of genuine White Pine . . . a sill slope 60 % greater than usually found on window frames.

Other *new* features are the locked sill joint, the chamfered blind stop, the inside liner and the wide blind stop. These features with the 3-inch per foot sill slope give the architect a truly weathertight installation, plus perfect drainage, plus precise accuracy in construction.

Each frame is equipped with Andersen patented noiseless pulleys, guaranteed for a lifetime of trouble-free operation.

THE ANDERSEN FRAME CORPORATION
Bayport, Minnesota
Represented by 4,000 Leading Jobbers and Dealers

Andersen MASTER Frames



Actual photograph showing Andersen's steep sill slope and chamfered blind stop, which insures perfect drainage



Model home at Amarillo, Texas. Architects: Berry and Hatch; Andersen Master Frames No. 604 from Amarillo Sash & Door Company

for a leakproof installation

(Continued from page 92, advertising section)

consecutive years when residential building was doubtless above normal from the viewpoint of relationship to total construction volume. For the first half of this period there was need for such large activity to supply housing facilities which had been deferred by war conditions and the readjustments which followed. For the latter half of the period production of housing proceeded at a pace which was distinctly out of line with other economic movements. The conditions which this maladjustment brought are those which, although somewhat delayed, contributed forcibly to the causes of the general business depression.

During the period of large residential activity the totals were swelled by the operations of speculative builders intent upon profits from the sale of their products. Though investment building proceeded apace it was the production of speculative projects that operated to upset the residential field.

Today this condition is materially altered: many speculators have been forced out of the industry by economic conditions; opportunities for profit on the sale of new residential properties are small. In consequence new residential building that will be undertaken during the current year will doubtless be dictated largely by investment considerations. In this movement the apartment house type will be of increasing importance where production and operating economies are more easily effected.

Lowered construction costs which are now variously estimated at from 10 to 20 per cent below a year ago will doubtless stimulate residential construction in sections where conditions of supply and demand are near normal. Such new building will in all likelihood make for lowered rentals, which in turn will affect existing rentals in older structures. Already evidences of this tendency are accumulating and this condition must be reckoned with as a part of the readjustment which 1931 will see in the building industry.

There is still large need for better housing for the masses whose incomes are low and for whom little new housing has been provided. The growing resources of savings banks, the increasing reservoirs of life insurance companies and building and loan associations, may find profitable employment in filling this urgent need. To the extent that better housing for less money can be provided for the masses during 1931 will residential building show improvement. Vigorous pressure for sales of consumable goods will never restore prosperity since prosperity depends upon the production of wealth. Housing of the investment types is wealth. Recovery from depressions always has been spontaneous in the past but only after the conditions which brought them about had been removed. The recovery from the present depression will be signaled when the causes which brought it about have been dissipated, and of these causes not the least important was speculation in residential building.

The semi-annual survey of the real estate market recently released by the National Association of Real Estate Boards covering 349 cities shows clearly some of the factors which must be more closely attuned to insure genuine recovery in building. Builders have found it increasingly more difficult to obtain funds for new building operations except in such cases where conditions of demand have indicated opportunities for profit without undue risk.

The survey discloses diverse tendencies in money conditions as between cities of different sizes. Cities having a population of 500,000 or more disclose supplies of mortgage money in excess of demands, but this surplus will not likely be made available unless genuine demands for space exist, so closely are the financial interests watching space conditions. In cities of smaller size the availability of mortgage money in excess of demands is lower while more than half of the cities of less than 25,000 inhabitants report money demands in excess of supplies.

Thus it appears that the smaller cities offer investment opportunities for the most part not to be found in the metropolitan centers. It is in these smaller cities that overbuilding reports covering residential properties show relatively the most favorable conditions. For single family dwellings the survey shows 62 cities of less than 25,000 inhabitants where building is normal; 29 cities where it is under current demand; and only 9 where there has been overbuilding. For cities over 500,000, 85 report normal conditions; none shows current building less than demand; while 15 show overbuilding. For apartment houses similar comparisons between the larger cities and those under 25,000 inhabitants are disclosed in the report.

The survey further shows that real estate sales have in most cities brought lower prices than a year ago, reflecting not only decreased values but also the effects of forced liquidation. At the same time there has been a marked downward trend in rents on one- and two-family houses, with almost 60 per cent of the reporting cities showing this declining tendency. For apartments only 33 per cent of the cities which reported show lowered rentals than a year ago. In the meantime foreclosures on investment residential properties, principally apartments, have been large and construction costs have declined.

Foreclosure acquisitions have put purchasers in a position of advantage over builders so far as opportunities for investment on capital outlay is concerned. Rentals on properties thus acquired can bring larger return than rentals on fairly similar conveniences in new undertakings. It is not unlikely that further shading of rentals on foreclosed properties, if competition for tenants makes it necessary, may in effect become an important retarding influence upon new residential building.

L. SETH SCHNITMAN

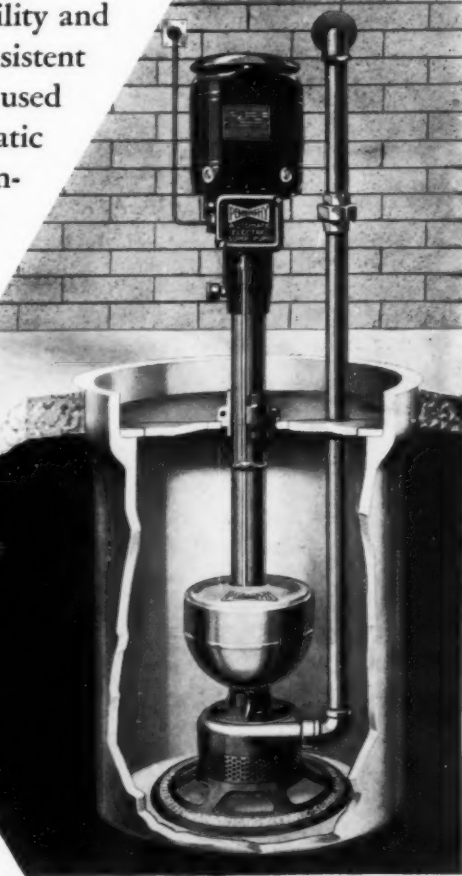
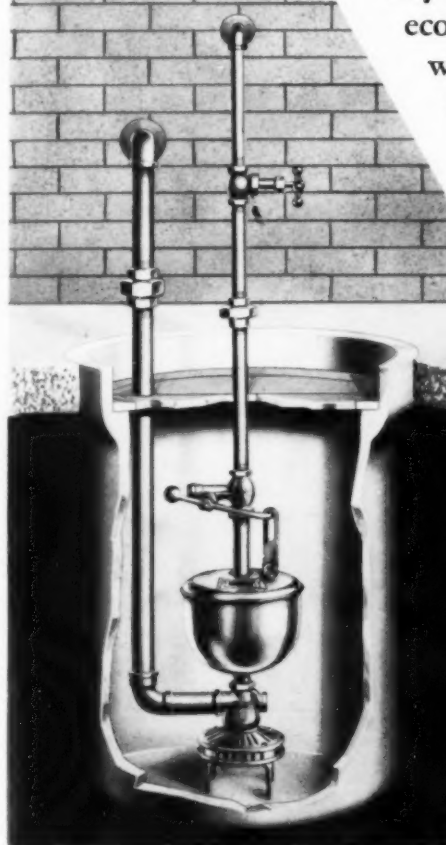
the Pumps that *Cannot Rust*

Rust, the eternal enemy of iron and steel, is ever alert for the attack whenever these metals are exposed to water, and protective coatings are at best only a partial defense. ¶ Positive protection against the danger of rust has been achieved in the Penberthy Automatic Electric Sump Pump and the Penberthy Automatic Cellar Drainer, by the complete elimination of iron and steel. These pumps are built of copper and bronze throughout — they cannot rust. ¶ Dependability and economy of operation are consistent with the quality of materials used in the Penberthy Automatic Cellar Drainer and the Penberthy Automatic Electric Sump Pump.

*Both types are carried
in stock by leading
jobbers throughout
the country*

PENBERTHY
Automatic
(Hydraulic)
Cellar Drainer

PENBERTHY
Automatic
Electric
Sump Pump



▽
△
COPPER
AND BRONZE
THROUGHOUT

PENBERTHY INJECTOR COMPANY
DETROIT

ESTABLISHED
IN 1886

CANADIAN PLANT
WINDSOR, ONT.



New Harvard Gymnasium, Cambridge, Mass.
Architects: Coolidge, Shepley, Bulfinch & Abbott

On Fine Buildings and Residences from
Coast to Coast There Is No "Or Equal" for

BROWNSKIN

Resilient
Building Paper

It is a dominant fact that Resilience "the Factor of Safety" found exclusively in Brownskin has no counterpart—*Or Equal*—in any other building paper.

Many Architects, therefore, familiar with the advantages of this extraordinary paper, deliberately specify Brownskin and drop the "OR EQUAL" clause.

This is especially true on Stucco Construction where Brownskin has proved to be the only building paper that will expand and contract with the stucco without breaking.

And on ordinary construction it is also a fact that all non-resilient papers split—tear and drag from the nails when subject to building strains, shrinkage and settling, whereas Brownskin meets these distortions without breaking. It's safest to specify and insist on Brownskin, the Resilient Building Paper.

Samples and complete information on request.

ANGIER CORPORATION
Framingham Massachusetts



California residence sheathed in Brownskin ready for stucco work
Owner, R. T. Creswell. Architect, H. G. McMastern



Otto Sarony Co

FREDERICK WILLIAM WINTERBURN

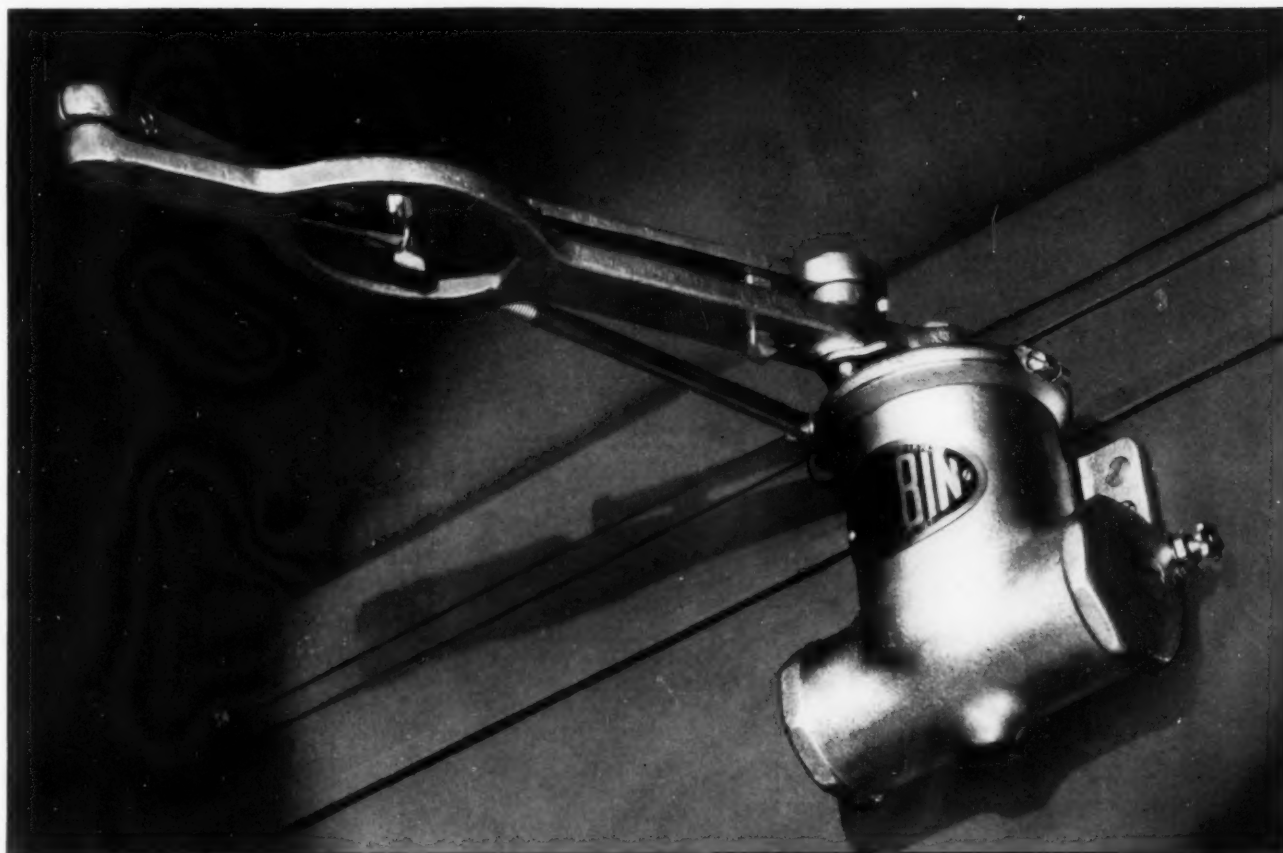
Mr. Frederick W. Winterburn was born in Liverpool, England, July 30, 1849, and came to the United States with his parents at the age of four years. His family settled first in New York City, then in Coytesville, New Jersey, and finally in Edgewater, New Jersey. Here he lived for many years, taking active part in civic and church affairs. During the past thirty years he had his residence at 104 Riverside Drive, New York, and spent his summers at "Coprock", his Pocantico Hills estate. It was there that he died on September 2, 1930, at the age of eighty-one.

Early in the seventies he went back to England where he studied architecture at the Kensington Art School, London. At the age of 22 he returned to New York to practice his profession, having an office at 31 Nassau Street, New York, until about July, 1889, when he became associated with Mr. Charles W. Clinton at 32 Nassau Street. On May 1, 1894, Mr. William H. Russell of Renwick, Aspinwall and Russell joined with Mr. Clinton under the name of Clinton and Russell. Mr. Winterburn continued his association with this firm until he retired about twenty years ago.

In 1899 he joined the Architectural League of New York and became a member emeritus after twenty-five years. He was one of the oldest members of that association when he died.

During his association with Clinton and Russell, many of New York's large and important buildings were designed and erected, among which were the Mutual Life Building, Hudson Terminals, Apthorpe Apartments, Hotel Astor, Atlantic Mutual, 71st Regiment Armory, Graham Court, United States Express Building, American Exchange Bank, 60 Wall Street, Broad Exchange Building, 160 Broadway, 170 Broadway, Chesbrough Building, and many others.

Exclusive new Corbin device for self-closing fire doors wins full Underwriters' okey



GOOD BUILDINGS DESERVE GOOD HARDWARE



Requests from many of our friends in the profession to solve the problem they have met of securing a practical, simple, safe device for automatically closing doors in case of fire can now be answered. We are proud to announce a new *Arm with Fusible Device* for automatically closing fire doors that can be used with the regular Corbin Door Check. It is simple in design, compact, easy to apply and adjust, and it is positive in its function. Corrosion after long idleness cannot make it ineffective. Consequently it has won full approval of the Underwriters' Laboratories both for doors opening 90° and on up to 180°.

P. & F. CORBIN SINCE 1849 New Britain, Connecticut, U. S. A.

The American Hardware Corporation, Successor

New York

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Philadelphia

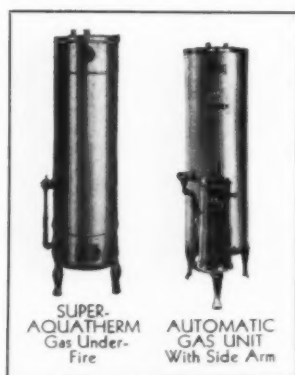
NOTE—Upon request we shall be glad to forward for your files a bulletin completely describing this new Arm with Fusible Link for use with regular Corbin Door Checks. Just clip this paragraph and ask your secretary to send for the bulletin at once.

This will interest EVERY PURCHASER of Hot Water Boilers!



THE fact that copper is the ideal metal for hot water boilers is accepted by every one. It's almost entire freedom from corrosion under all conditions of water supply gives it a life far exceeding that of the ferrous metals. Even at the normal differential in price between copper and iron or steel, copper boilers are much cheaper in the long run due to their longer life and lower upkeep. Today, however, the differential in price between copper and steel or galvanized iron is so much less than normal that the purchaser is short-sighted indeed who neglects this exceptional opportunity to save money by specifying the superior copper boilers for new work or replacements.

The Dahlquist Manufacturing Company confines its entire hot water boiler production to copper and manufactures units in this metal from the smallest range boiler to the largest industrial tanks as illustrated above.



The Dahlquist Company has introduced and patented many exclusive technical improvements which, without extra cost to the user, have greatly increased the general efficiency of the boilers. The famous Dahlquist Aquatherm and the new Turbo-Aquatherm can be had only in Dahlquist copper boilers and full information will be gladly sent to those interested.

Dahlquist Mfg. Co.

A, 2nd & West 3rd Streets

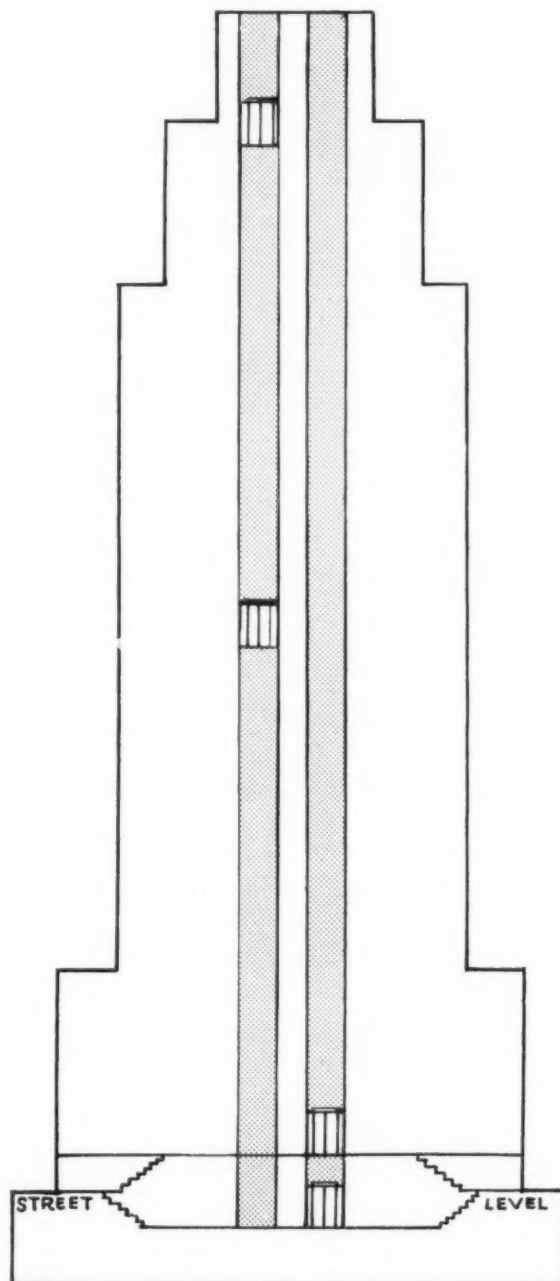
So. Boston, Mass.

NOTES IN BRIEF

TWO ELEVATORS IN ONE SHAFT

An elevator of a new type with two cars operated separately in the same shaftway has been built by the Westinghouse Electric and Manufacturing Company and placed in regular service in that company's main office building at East Pittsburgh, Pa.

A study of the elevator layouts of certain typical projected buildings shows that the use of dual elevators in these cases would save floor space that could be rented for from \$35,000 to \$85,000 a year.



DUAL ELEVATOR OPERATION

In the right shaft the two cars are ready to ascend. In the left shaft the cars have reached their limit of travel and are ready to descend.

(Continued on page 100)

EXCLUSIVE DESIGNS BY RUSSWIN

✦ ✦ ✦ italian renaissance

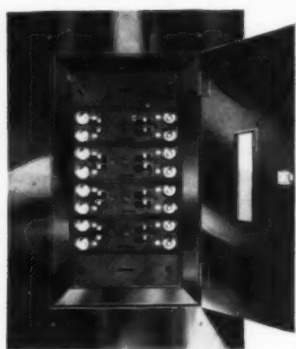
BRAMANTE . . . an exclusive RUSSWIN interpretation of the Italian Renaissance . . . features the sculptured detail of acanthus leaf and shell, contrasted with the chaste severity of finely proportioned panel . . . an ideal selection for the home or business structure styled in any of the classic periods. Base metals of brass or bronze assure, under the most rigorous usage, a life-time of un-failing, trouble-free service. Your architect or contractor knows RUSSWIN quality. Write to us for descriptive booklet showing exclusive RUSSWIN hardware for leading periods of design.



For the architect's convenience, RUSSWIN hardware is illustrated and described in Sweet's Catalogue . . . Pages C-3700; C-3775

Whatever your hardware needs may be in home or office building, simple or elaborate, the wide and varied range of authentic designs by RUSSWIN assure full accord with architectural style in every lock, hinge, knob or door closer.

RUSSELL & ERWIN MANUFACTURING COMPANY (THE AMERICAN HARDWARE CORPORATION, SUCCESSOR)
New Britain, Connecticut New York Chicago London



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*There is ready and practical co-operation awaiting you at **FA**. Write or call an **FA** man.*

Frank Adam
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Chicago, Ill.	Philadelphia, Pa.
Cincinnati, Ohio	Pittsburgh, Pa.
Cleveland, Ohio	St. Louis, Mo.
Dallas, Texas	San Francisco, Calif.
Denver, Colo.	Seattle, Wash.
Detroit, Mich.	Tulsa, Okla.
Kansas City, Mo.	Toronto, Can.
Los Angeles, Calif.	Vancouver, Can.
Memphis, Tenn.	Winnipeg, Man., Can.
Minneapolis, Minn.	Hamilton, Ont.
	Montreal, Can.

FA Panelboards are the
"Sign of a Better Job"

NOTES IN BRIEF—Continued

At 6 per cent interest these sums represent capital investments ranging from a half million to over a million dollars; and it can be said that the entire elevator installation for many buildings over 20 stories high can be financed from the additional income made possible by substituting dual elevators for separate banks of local and express cars.

The details of the operation of a dual elevator will naturally vary with the height and character of the building, the number and speed of the elevators, and many other conditions, but the following will illustrate some of the features of an installation for a 20-story building.

The upper car of the two is the express car. It starts from the street level and, running without stops to floor 11, serves the floors from that point to the top. It is entirely unrestricted as to its operation except that it is automatically prevented from running downward while the lower car is running upward. It can, however, be "inched" up or down by hand in case of an emergency. As soon as the express car is out of its way, the lower or local car, which has been waiting at a basement level, rises to the street level and then serves the lower ten floors. It, too, is unrestricted except in one respect—it cannot approach the upper car within a predetermined distance. Should the attempt be made to run the lower car up against the upper one, it will be automatically slowed down and stopped at the proper point and held there until either its operator runs it downward or the upper car moves farther upward.

Car operation is so timed that both cars will normally reach their upper limits of travel at about the same time, but if the express car arrives at its destination first, it is held there until the local car completes its run and starts downward. On the descent of the two cars, the same safety precautions apply—the lower car cannot run upwards towards the upper car, and the upper car will be stopped if it comes too close to the lower.

HARVARD SCHOLARSHIPS FOR SPECIAL STUDENTS

To men admitted as special students to the School of Architecture, Harvard University offers, for the academic year 1931-32, three scholarships with an income equal to the tuition fee. The scholarships will be awarded to those candidates who, having fulfilled all other conditions, stand highest in a competition in architectural design to be conducted by the University.

Candidates must apply to Dean G. H. Edgell, School of Architecture, Robinson Hall, Harvard University, Cambridge, Mass., on or before Saturday, February 21, giving the name of their employer, and must fill out and file with the Dean a blank form of application not later than Saturday, March 7.

RADIATHERM

The American Radiator Company is marketing a new accessory called the *Radiatherm*, a simple thermostatic device for automatically and indi-

(Continued on page 102)



AN IDEA for ARCHITECTS

Here's a way to convert those usually unwelcome residence remodeling jobs into something of a pleasure and profit. Nothing will emphasize more clearly the change from the old to the new than the use of a few stately columns or a beautifully designed entrance. Hartmann-Sanders make it easy for you to achieve something really fine in remodeling work by furnishing columns which lend correctness and artistry to every detail, and colonial entrances that are authentic and beautifully executed.

In selecting columns, you will find that Hartmann-Sanders have a most complete line to choose from, all authentically correct. They are made of clear knotless lumber with Koll's Patent Lock Joint, which absolutely prevents warping, loosening, or opening up. This feature and the many other qualities of structural excellence which Hartmann-Sanders have developed during thirty years' specializing in exterior woodwork, explain why hundreds of architects specify only Hartmann-Sanders columns.

HARTMANN-SANDERS

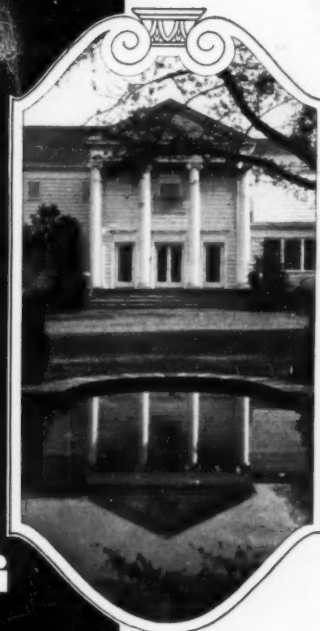
2155 ELSTON AVE., CHICAGO
101 PARK AVENUE, NEW YORK
(Architects' Building)

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900 N. ILLINOIS ST. BELLEVILLE, ILLINOIS



NOTES IN BRIEF—Continued

vidually controlling the steam supply to each radiator on two-pipe systems. This new device effects independent and automatic temperature control for each room. As long as an adequate heating system is in operation, individual room warmth is uniformly maintained at whatever temperature desired. Thus, if the occupant of one room wishes to maintain a temperature of 80°, and the occupant of another room prefers 70°, both get that temperature automatically with the Radiatherm.

It is claimed that economies in fuel to the extent of 20% to 40% are possible, as compared with systems employing hand-operated valves, because the temperature of a predetermined constant is maintained regardless of changes in pressure of outside temperature.

BONDED BUILT-UP ROOFS

A specification booklet giving full particulars and detailed information on asbestos felt and asphalt felt, coal tar pitch and tarred felt, etc., on roofs of various finishes—smooth, gravel, slag—for use over board sheathing, over poured concrete, over steel decks, over precast gypsum blocks, over book tile and under promenade tile. Chart of roofs giving specifications and weights. Detailed specifications (Underwriters' Laboratories Class A and B Rating), including general requirements applying to the contractor, specifications for laying roofing, materials and workmanship, general notes, etc. Detail drawings included. Typical installations. The Ruberoid Co., 95 Madison Avenue, New York City. 8½" x 11". 16 pp. Ill.

GYMNASIUM, UNIVERSITY OF CHICAGO

Armstrong, Furst and Tilton are the architects of the Sunny Gymnasium at the University of Chicago, a view of which was published on page 82 of the January Technical News and Research article on Gymnasium Planning. The photograph was reproduced by courtesy of the Federal-American Cement Tile Co.

DESIGNER OF CANBERRA

Frederick A. Muhlenberg, architect, who compiled the list of architectural candidates for Rensselaer's Hall of Fame which appeared in the January *Notes in Brief*, writes that he wrongly attributed the design of Canberra, the capital of Australia, to Frank Lloyd Wright. Credit should have been given to Walter Burley Griffin as the designer.

A CORRECTION

The advertisement of the Peerless Unit Ventilation Co., Inc., which appeared on page 67 in the January issue of *THE RECORD* and which featured the Floral Park-Bellerose School at Floral Park, Long Island, listed incorrectly the names of the architect and contractor. Credit should have been given to Edward Hahn, Hempstead, L. I., as architect, and to James McCullagh Co., Hicksville, L. I., as contractor.